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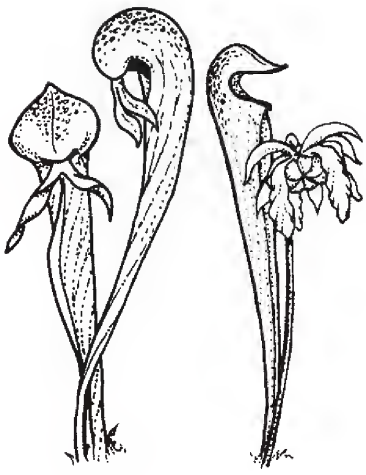

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Front Cover: *Drosera lowriei*, named after Allen Lowrie, author of Carnivorous Plants of Australia, Magnum Opus. Photo taken east of Perth, Western Australia by Richard Nunn. Article on page 120.

Back Cover: Top: *Drosera dichrosepala*. This species has only recently been rediscovered by Allen Lowrie, finally matching the correct plant with the Type material. Image taken at Katanning, Western Australia. Bottom: *Drosera verrucata*. Incorrectly named *D. dichrosepala* for many years. On the discovery of the true *D. dichrosepala*, this species needed renaming. Image taken at Cheyne Beach, Western Australia. Photos by Richard Nunn. Article on page 120.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

All correspondence regarding dues, address changes and missing issues should be sent to the Membership Coordinator at the ICPS. Do not send such correspondence to the editors. Checks for subscriptions should be made to the International Carnivorous Plant Society in US funds. Dues, including a subscription, are $30 per year.

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Changes

Recently, there have been some major changes on the ICPS Board and Volunteer front. We are glad to report that Keith Becker is now handling the Secretarial work. We also reintroduced the Membership Secretary position and Sheila Stewart will perform this duty. John Brittnacher will focus more on technical issues. The Seed Bank and our Store will be managed by Joe Griffin. Finally, Ryan Ward is the new Treasurer. With all of these changes comes a transition period requiring transfers of data, access to accounts, etc. Some things may take a little longer than usual for a while. We hope you will be understanding. If you have any questions or concerns, please send an e-mail to us at inquire@carnivorousplants.org.

We would also like to thank Cindy Slezak and Richard Meyers for the many years of work and effort they put into our society.

Marcel van den Broek
President

Erratum: There was a typographical error on page 95 of the June 2015 CPN in the article Carnivorous plant cultivar names registered in 2014. The corrected entry should read: *Sarracenia* 'Silvia Luise' D.Righetti, Carniv.Pl.Newslett.43:23 (2014).

Biology of the trapless rheophytic *Utricularia neottioides*: Is it possible to grow this specialized species in cultivation?

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Keywords: *Utricularia neottioides*, aquatics, rheophytes, ecology, cultivation.

Abstract: The nearly trapless aquatic bladderwort *Utricularia neottioides* is one of the most remarkable and curious *Utricularia* species, growing attached to bare rock in streams of South America. It has never been cultivated due to its rheophytic habit and unknown ecological demands. As late as in 2012, one of us (KP) was able to grow this species in tissue culture from seed, so that the species has become available for cultivation and for anatomical and ecophysiological investigations. In this paper, we describe the biology of the species based on observations made in natural habitat and cultivation, its growth in *in-vitro* and *ex-vitro*, and raise the question whether it can be grown long-term *ex vitro* at all.

Introduction

The small *Utricularia* section *Avesicaria* (the sectional name, proposed by Kamieński (1891), means "without vesicles", i.e. without traps) comprises only two South American amphibious species which grow strictly attached to bare rock in shallow streaming or seeping waters (so-called "rheophytes"), *Utricularia neottioides* A.St.-Hil. & Girard and *U. oliveriana* Steyerm. (Taylor 1989). *Utricularia oliveriana* reminds one of a typical, tiny terrestrial *Utricularia* species with distinct, spatulate leaves (actually these foliar organs represent modified shoots), bearing the typical bladder traps on stolons and petioles (Fig. 1), whereas *U. neottioides* has greatly modified, finely filamentous leaf-like shoots which gently swiftly move in swift-running waters, and which are practically trap-less (Figs. 2, 3, 4). Yet the flowers are very similar in both species.

Probably the most detailed morphological studies on the exceptional *U. neottioides* have been performed by Luetzelburg (1910). He and Kuhlman (1938) were among the very few botanists who ever found this species with a few traps present, on material collected in Brazil. A few of their specimens are the source of the scarce trap material available, on which subsequent studies (Lloyd 1932, 1942; Taylor 1989) were based. Peter Taylor mentions: "traps few or often apparently absent", but also that "[...] traps are usually present, as in all other *Utricularia* species, and I have observed them on many of the [...] specimens that I have seen" (Taylor 1989). However Lloyd did not find any traps on the Kew material studied at his time.

Utricularia neottioides personally examined by one of us (AF) both in the field at several locations in Brazil and on rich herbarium material did not show a single trap on any of their vegetative organs. This species therefore even has been considered a trap-less, hence "non-carnivorous", bladderwort (Kamieński 1891; Fleischmann 2011). Furthermore, on all cultivated

Figure 1: *Utricularia oliveriana* growing attached to sandstone rock in shallow, running water at a river margin, Gran Sabana, Venezuela. Photo by Andreas Fleischmann.

Figure 2: *Utricularia neottioides* growing in a small stream in the Serra do Cabral, Minas Gerais, Brazil. Photo by Andreas Fleischmann.

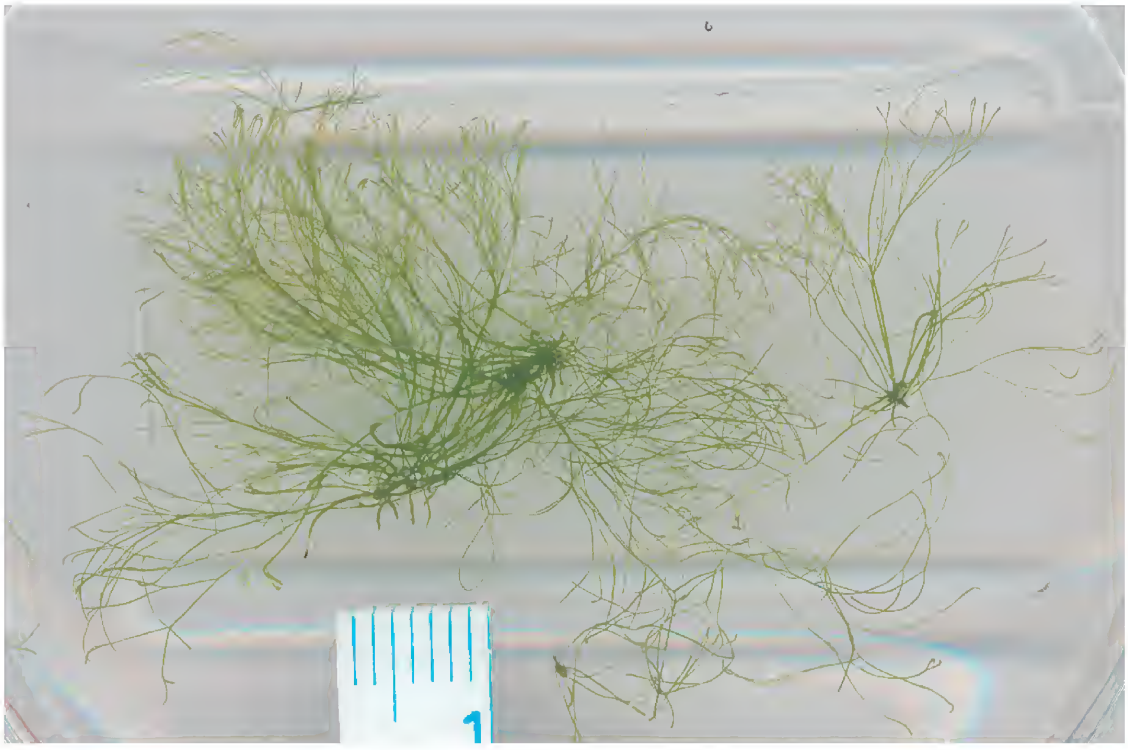

Figure 3: Shoots of *Utricularia neottioides* from *in-vitro* culture. Scale = 1 mm. Photo by Lubomír Adamec.

Figure 4: The usually trap-less, filamentous leaves of *U. neottioides* in quickly running water, Minas Gerais, Brazil. Photo by Andreas Fleischmann.

specimens, we have never found any traps. However, Luetzelburg (1910) and Lloyd (1932, 1942) studied and illustrated some scattered traps of the species from field-collected Brazilian material. Apparently the material collected by von Luetzelburg and by Kuhlman is among the very few specimens of *U. neottioides* that possess any traps; Taylor (1989) later based his studies and illustrations on two additional, more recently collected specimens with few traps present on leaves and stolons. Lloyd (1932) and Taylor (1989) describe the traps as ovoid (or "streamlined", following Lloyd 1942) with a deep overhang, ca. 1 mm long, dark brown in color, and apparently normally functioning. The quadrifid trap glands have been illustrated by Lloyd (1942) and Taylor (1989).

Quite in contrast to our observations (and those made by Lloyd 1932 and Taylor 1989), Kuhlman (1938), who studied the species in Brazil on several occasions, reports that this species apparently always bears traps (with three antennae on one side), although in much lower numbers than any other *Utricularia* species.

As perfectly illustrated by Luetzelburg (1910) and Taylor (1989), *U. neottioides* bears stiff, coralloid, claw-like rhizoids 0.2-0.4 mm thick, by use of which the plants affix themselves to the bedrock of the streams (Fig. 5). These are located on creeping thick stolons several cm long, which also bear 1-4 cm long, sparsely pinnatisect, filamentous "leaves" (in fact the "leaves" are modified leaf-like shoots, as in all aquatic *Utricularia*; see e.g. Rutishauser & Isler 2001). These leaves are bright green to bronze-colored or red, depending on light levels, and densely covered by long, unicellular, transparent hairs (Fig. 7). Generally, the filamentous leaves (diameter of ca. 60 µm) are truly reminiscent of filamentous green algae, e.g. of the genus *Cladophora*. Interestingly, the "leaves" of *U. neottioides* are not only formed from the stolons in this species (like in all other *Utricularia*), but (uniquely among *Utricularia*) also from the lowermost bracts of the flower scape (Luetzelburg 1910; Fernández-Pérez 1964; Taylor 1989) – this strange morphology is paralleled in the unusual riverweeds (Podostemaceae), likewise rheophytes adapted to very similar habitats.

Not surprisingly, due to the turbulent habitat of *U. neottioides*, the leaves and shoots of this species are inhabited comparatively by much fewer periphytic algae, such as desmids (Desmidiaceae), although aquatic *Utricularia* are generally a good habitat for these algae: Förster (1964) found only seven different taxa of desmids growing on *U. neottioides*, while other Brazilian aquatic *Utricularia* had 13-94 different desmid inhabitants (for comparison: five were found on the terrestrial *U. subulata*).

Flowering in *U. neottioides* is apparently sometimes induced by low water levels (Rivadavia 1991). The scapes can be up to 30 cm long (Taylor 1989; Rivadavia 1993). The cream-white corolla has a deeply trilobed lower lip, and the palate consists only of a shallow ring-like rim, so that the entrance to the tube and spur remains open (as seen in front view, Fig. 6). The flowers of this species (and *U. oliveriana*) have a sweet scent (AF, pers. obs.), which probably attracts a specific pollinator. Seeds are different from all other *Utricularia* (Taylor 1989), probably in adaptation to dispersal and seedling establishment in the demanding riparian habitat. The seeds become mucilaginous when wet (Lloyd 1942; van Steenis 1981) and thus can attach to rocks and stones of the riverbed, especially during the dry season when water levels are low.

Interestingly, a similar rheophytic habit has evolved in parallel in an African lineage of aquatic *Utricularia*, again a species pair (*U. rigida* Benj. and *U. tetraloba* P.Taylor), comprising *U.* section *Avesicarioides* (Taylor 1989). Molecular phylogenetic results show that these two species, which are superficially very similar to *U. neottioides*, are only distantly related to it. Thus, the rheophyte habit indeed evolved independently at least twice in *Utricularia*, and in both cases this happened from terrestrial lineages (Müller *et al.* 2006).

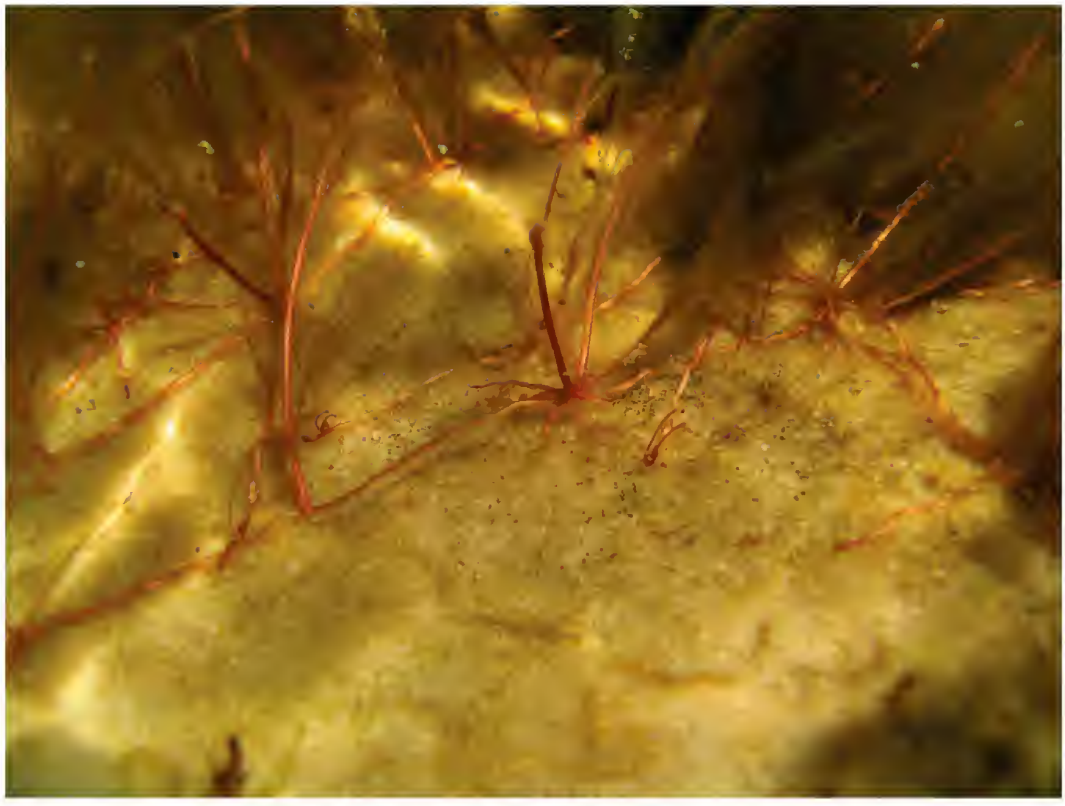

Figure 5: The claw-like rhizoids of *U. neottioides* which anchor the plant firmly to the sandstone bedrock. Leaves and flower scapes are produced from the thick stolons. Photo by Andreas Fleischmann.

Figure 6: Flowers of *U. neottioides* from Minas Gerais. Photo by Andreas Fleischmann.

Figure 7: Microscopic photo of an *U. neottioides* leaf from *in-vitro* culture. Scale = 100 µm. Photo by Lubomír Adamec.

Natural Habitats

Utricularia neottioides is a so-called "torrenticolous rheophyte" (van Steenis 1981), as all vegetative parts of the plant are permanently submerged in quickly running water, with only the flower stalks produced above the water-line. The plants can form large carpets in suitable habitats, where they are often the only flowering plant inhabiting the stream (Fig. 2). In shallow pools they can remain in full growth during the dry season as a perennial. However in habitats where the streams become fully dry, this species can also grow as an annual. According to Taylor (1989), *U. neottioides* is distributed across a relatively vast territory of tropical South America: it is recorded from Colombia, Venezuela, Bolivia, and Brazil (majority of states except southern-most). Typical habitats are shallow, swiftly flowing, cool, acidic, dystrophic ("Coca-Cola-colored", Rivadavia 1996) torrents and streams of mountainous areas, and the plants are affixed only on rocks and stones (predominately sandstone rocks), but never on a soft sediment or sand (AF, pers. obs.). A detailed description of the habitat of this species is given by Rivadavia (1996). The species occurs at altitudes from ca. 300 to 1800 m a.s.l., but is generally restricted to cooler highland waters. The majority of these streams are dark brownish (i.e., dystrophic or humic): this fact can be important both for nutrition of this species and for the requirement of the plants for irradiance. However, at most sites (see Fig. 2), the plants grow under bright sunshine as a result of which the leaves/shoots are red and relatively thick (Figs. 4, 5) – as heliophytes; they have only very rarely been found growing in more shaded habitats (F. Rivadavia, pers. comms.).

Interestingly, the leaves of *U. neottioides* are often covered by fine filamentous algae (see Fig. 4) bestowing the leaves with a mucilaginous character. Moreover, as opposed to other aquatic *Utricularia* species growing at the margins of South American streams (e.g. *U. oliveriana*, *U. trichophylla*), the sites inhabited by *U. neottioides* are probably ecologically so extreme that no other aquatic

Utricularia species co-occurs. One would guess a very low pH in these dystrophic waters but the only information on pH from some Brazilian sites available is rather surprising (pH 7.8-8.0; Vitor de Miranda, pers. comm.). Moreover, one of us (AF) several times saw *U. neottioides* surviving also in temporarily, shallow standing pools or ditches remaining from the streams after the water level has sunk in the dry season. Rivadavia (1996; pers. comms.) found the species growing as an affixed aquatic in gravel, red soil, and grey clay. Thus, these findings justify the view that *U. neottioides* may not be a strict rheophyte and support efforts in cultivation. Its rare occurrence in warm waters in lowlands justifies the view that this species may not be strictly adapted to low temperatures. Fernández-Pérez (1964) classified *U. neottioides* as having a "habit intermediate between aquatic and terrestrial" – and indeed the two rheophytes of *U.* section *Avesicaria* are closely related to the terrestrial species of the affinity of *U. subulata* (*U.* section *Setiscapella*), but not to any other aquatic species, a fact already concluded by Taylor (1989) based on common morphological traits. This is also supported by molecular phylogenetic results (Müller *et al.* 2006). Due to its unique habitat and apparently very specific ecological needs, as well as previous failures to maintain wild-collected specimens in cultivation, *U. neottioides* species has been claimed almost un-cultivatable (Rivadavia 1996).

Growth in *in-vitro* Culture

Out of several dozens of seeds of *U. neottioides* collected at Itacambira, Minas Gerais, Brazil, and sterilized by a sodium hypochlorite solution, only one germinated in our *in-vitro* culture. Nevertheless, that plant grew very vigorously in a sterile tissue culture, in liquid or solid half-strength Gamborg B5 medium (for all cultivation details, see Adamec & Pásek 2009). The plants grow so rapidly under these conditions that an initial plant stock can occupy a whole E-flask in only 1.5-2 months. Therefore, it is comparatively the most rapid *in-vitro* growing aquatic *Utricularia* species that we know of. As shown in Figs. 3 and 7, *in-vitro* plants form a net of poorly branched, finely filamentous, light green leaves (leaf diam. ca. 60-75 µm) 2-5 cm long, while the thicker and darker rhizoids and stolons are ca. 0.2 mm wide. Most leaf filaments are terminated by a U-shaped bifurcation (Fig. 7). All shoots are densely covered by long translucent hairs. Neither traps nor inflorescences have ever been formed *in-vitro*. Basal rhizoids and stolons become black and decay in old *in-vitro* cultures. The reliable and very rapid growth *in-vitro* has provided sufficient plant material for some experiments in *ex-vitro* cultivation.

Growth *ex-vitro*

We attempted growing *U. neottioides* in many aquatic cultures, both indoors and outdoors. Fresh shoots of *U. neottioides* were inserted into several aquaria or bigger plastic containers with humic water, a method used successfully with other aquatic carnivorous plants for years (see Adamec 1999), where sedge (*Carex* spp.) litter was used as the only substrate. The *U. neottioides* plants were either kept isolated in aquaria, or mixed with other aquatic carnivorous plant species. However, regardless of the indoor or outdoor position of the aquaria and other containers, their volume, irradiance, temperature, water chemistry, presence or absence of other carnivorous species, or bubbling the water gently by air, the *U. neottioides* shoots quickly became greyish, then died and decomposed completely within only 1-3 weeks. Moreover, aquarium snails *Gyraulus chinensis* (Twisted ram's-horn) very eagerly grazed the plants. Yet, even when snails were excluded through nylon netting, *U. neottioides* nonetheless failed to grow. The brighter the natural light was in the setup, the faster the

Figure 8: Terrestrial greenhouse culture of *U. neottioides* on brown peat. The maximum height of the shoots is ca. 2 cm. Photo by Kamil Pásek.

decay occurred. Surprisingly, plants survived relatively better and longer when placed at the bottom of aquaria in deeper shade. Similar to e.g. *U. floridana* shoots, the dense cover of partly hydrophobic hairs on *U. neottioides* shoots renders these hydrophobic. Due to water surface tension, the stolons remain adhered to the water surface. When a small plant fragment was enclosed in a 0.5 liter bottle containing humic water with a high CO_2 concentration, survival was somewhat longer but no new growth was observed.

It has thus become apparent to us that *U. neottioides* cannot be artificially grown as a submerged, freely floating aquatic, for unknown reasons. The same conclusion was also made in the laboratory of V. de Miranda in Brazil (pers. comm.), where again no traps were formed during cultivation trials.

Surprisingly, far better results were achieved when *in-vitro* raised *U. neottioides* shoots were softly placed on the surface of very wet, fibrous brown peat (with or without the addition of quarzitic sand), conditions similar to those used for growing terrestrial carnivorous plants. In a humid greenhouse at 15-25°C and in reduced light (ca. 10-20% light), the initial shoots regenerated within about two weeks, and new growth was observed, yet not as large and vigorous as seen in naturally growing plants – more like a stunted, terrestrial growth of this remarkable aquatic (Fig. 8). We confirmed repeatedly that the regeneration of submerged shoots into newly grown terrestrial ones started as soon as after 5-6 days and proceeded completely very quickly in 2-3 weeks. Evidently, high relative air humidity above the peat substrate is necessary for this regeneration, e.g. in a closed container. In a dry and hot greenhouse, it is possible to put *U. neottioides* shoots on brown peat in a smaller terrarium (2-3 l) which is covered by a translucent lid and which floats on the surface in a larger container filled with water for cooling. Such a thermostatted cultivation works better and

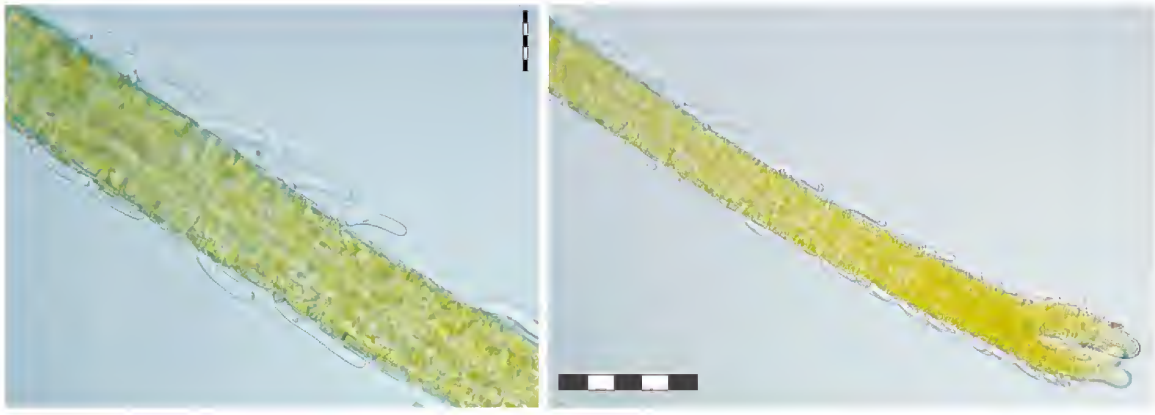

Figure 9: Detailed microscopic view of *U. neottioides* leaf from *ex-vitro* terrestrial culture (left). The leaf apex is branched into three lobes (right). Scale = 100 µm for the left photo, but 200 µm for the right photo. Photos by Lubomír Adamec.

more reliably. The terrestrial *U. neottioides* shoots are much shorter (ca. only 8-18 mm) than the submerged shoots *in-vitro* but are significantly wider (ca. 100-120 µm; Fig. 9). The shape and size of the translucent hairs are very similar.

Repeated transplantations of *U. neottioides* shoots from the *in-vitro* culture onto peat substrate revealed several interesting findings. First, as a result of these transplantations and regenerations, new terrestrial shoots were formed quickly during 1-3 weeks, but further growth stopped completely afterwards. The terrestrial shoots only survived for 5-6 months. The more biomass of *U. neottioides* from *in-vitro* cultures that was placed on the peat, the denser was the resulting terrestrial outgrowth. However, *no* new biomass was produced: the decomposed *in-vitro* biomass was only transformed into the new terrestrial one.

The same regeneration also occurred when terrestrial shoots were carefully laid onto the peat. Under suitable growth conditions (reduced light to ca. 10-15% of that in the open, 15 to 25°C, high relative humidity), terrestrial culture could survive at a constant state for at least 5-6 months. Nevertheless, after this period, the peat was usually overgrown by filamentous algae or mosses which impaired further plant survival.

Terrestrial cultures of *U. neottioides* confirmed that this species is adapted to lower temperatures. The plants were able to survive a wide temperature range (as daily extremes) between 8 to 35°C and died at temperatures >35°C; suggesting the optimum might be 15-25°C. Similar to the *in-vitro* cultures, flowering and traps have never been observed in plants growing in any *ex-vitro* culture.

Ecophysiological Investigations

Simple investigations were conducted to explain some ecophysiological traits of *U. neottioides* and, thus, to facilitate its cultivation. Using the 'final pH method' in 1 mM $NaHCO_3$ solution (Adamec 1995), the CO_2 compensation point of photosynthesis of shoots taken freshly from the *in-vitro* culture at ca. 22°C was 17.1±1.4 µM (n=6). In a similar study of 13 aquatic carnivorous plant species (Adamec & Pásek 2009), the values of CO_2 compensation points usually ranged within 3 to 8 µM for plants grown both *in-vitro* and *ex-vitro* in containers or aquaria. This means that the photosynthetic CO_2 affinity of *U. neottioides* shoots is rather low and that plants in the wild probably rely on relatively high ambient CO_2 concentration found in fast flowing waters. Furthermore, the aerobic dark respiration rate of *U. neottioides* shoots in an aquarium, measured using an oxygen sensor, was extremely high: ca. 50 mmol kg^{-1} (fresh weight) h^{-1}. Compared to other relevant data from shoots/

leaves of several aquatic *Utricularia* species (Adamec 2006, 2013), the respiration rate of *U. neottioides* was around 8-12 times higher! Such a high respiration rate might predetermine plant sensitivity to O_2 shortage in the ambient water. Besides, it also means that a very high net photosynthetic rate is strictly required to counterbalance high respiration rate. Taking into mind the rather low CO_2 photosynthetic affinity of *U. neottioides*, a very high CO_2 concentration (and possibly high irradiance) may be required in the ambient water for positive growth.

Conclusions

To our knowledge, *U. neottioides* cannot be grown successfully in any *ex-vitro* culture for some reasons, but it grows vigorously in an *in-vitro* culture with 2.5% sucrose solution. Meeting the evident requirement of high CO_2 concentration was not sufficient to keep plants alive. It is probably impossible to fulfill the growth needs of *U. neottioides*, except maybe if attached to sandstone in a specially designed stream pool aquarium. Considering that this almost trapless species occurs in dystrophic waters and is densely covered by long hairs, it is logical to assume that its nutrition is to a greater extent dependent on absorption of organic substances from the ambient water (e.g., humic acids) or attached filamentous algae. In this way, the necessary nitrogen might be mostly obtained from these special sources in nutrient-poor waters.

U. neottioides and *U. rigida* are the only *Utricularia* species with enormously suppressed trap formation, though the capability for trap formation is kept, as exceptional traps found on the leaves and shoots of these two species show. For this trait, *U. neottioides* was used as a model trapless species for comparative transcriptomic research (i.e., transcription of functional genes) at the University of South Bohemia at České Budějovice, Czech Republic.

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A FLORAL DESCRIPTION AND IMAGE OF THE RARE NATURAL HYBRID *SARRACENIA ×CASEI* MELLICHAMP (SARRACENIACEAE)

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Keywords: natural plant hybrids; *Sarracenia* hybrids, pitcher plant hybrids.

Abstract: *Sarracenia ×casei* Mellichamp is a rare natural hybrid cross between *S. alabamensis* subsp. *wherryi* and *S. psittacina*. In naming *Sarracenia ×casei*, Mellichamp (2008) briefly described the floral characteristics of this hybrid from one specimen from its only known locality. The paper provides additional floral information on this hybrid from a new locality discovered by the authors in 2014.

Sarracenia ×casei Mellichamp is a rare natural hybrid cross between *S. alabamensis* subsp. *wherryi* (D.E. Schnell) Case & R.B. Case and *S. psittacina* Michx. Until 2014, it was known only from its type locality north of Deer Park in Washington County, Alabama. However, the present authors discovered a second population in Baldwin County, Albama (Neyland *et al.* 2014).

In naming *Sarracenia ×casei*, Mellichamp (2008) briefly described the floral characteristics of this hybrid from one specimen. Specifically, he stated that the flower is small and that the scape, which is much longer than the leaves, is 35 cm long. Information concerning its floral characteristics and phenology is lacking in the literature. The purpose of this paper is to provide additional floral information on this hybrid. An image is also included (Fig. 1).

Figure 1: Image of *Sarracenia ×casei* flower at full anthesis.

Materials and Methods

This study is primarily based on field and specimen observations. Additional information, derived from the literature and from herbarium specimens, augments this study. Specimens were preserved using standard herbarium techniques. A permit for collected material was not required. Taxonomy follows Mellichamp and Case (2009). Herbarium abbreviations follow Thiers (2015).

Results and Discussion

Images of the specimen sheets for the holotype (Mellichamp *s.n.*) and isotype (Mellichamp *s.n.*) of *Sarracenia ×casei* were kindly

supplied by the UNCC and NCU herbaria respectively. Leaves and a single flower are present on the holotype sheet. Only leaves are present on the isotype sheet. From the present study, herbarium specimens (leaves only) are housed in the LSU (Neyland *2478*) and NCU (Neyland *2478*) herbaria. The single floral specimen is housed at LSU (Neyland *2483*).

The following was derived from the sole flower present in the newly discovered population (Fig. 1). Overall, the flower, when compared to those of most other taxa in the genus may indeed be characterized as small. For reference, the flower closely resembles, in size and color, that of *Sarracenia psittacina*.

Specifically, the calyx is 2.1 cm wide. The sepals averaged 2.3 cm long x 1.8 cm wide. Each is ovate, glossy, and maroon red. Three sepals exhibited yellow flecking. The petals averaged 2.5 cm x 0.8 cm wide. They are spatulate, involute, satin textured, and maroon red. The style is 0.9 cm wide. The flower was first at full anthesis on April 19, 2015 and bore no appreciable scent. It is noted that the date on Mellichamp's holotype is August 7, 1985. Therefore, it appears that the flower on that herbarium sheet is well past anthesis. The scape on the newly collected specimen measured 36 cm long whereas, the holotype scape measured 35 cm.

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A floral description and image of the uncommon natural hybrid *Sarracenia ×naczii* Mellichamp (Sarraceniaceae)

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Keywords: natural plant hybrids; *Sarracenia* hybrids, pitcher plant hybrids, *Sarracenia ×naczii*.

Abstract: *Sarracenia ×naczii* Mellichamp is an uncommon natural hybrid cross between *S. rosea* and *S. flava*. In naming *Sarracenia ×naczii*, Mellichamp (2008) briefly described the floral characteristics of this hybrid. This paper provides additional floral information on this hybrid from the type locality.

Sarracenia ×naczii Mellichamp is an uncommon natural hybrid cross between *S. rosea* Naczi and *S. flava* L. Confined to several counties in northwestern Florida, the type locality is located in a small roadside bog in Escambia County.

In naming *Sarracenia ×naczii*, Mellichamp (2008) briefly described the floral characteristics of this hybrid. Specifically, he stated that the flower is typically pale yellow with a pink cast. Additional information concerning its floral characteristics and phenology is lacking in the literature. The purpose of this paper is to provide additional floral information on this hybrid. An image is also included (Fig. 1).

Materials and Methods

This study is primarily based on field and specimen observations. Additional information, derived from the literature and from herbarium specimens, augments this study. Specimens were preserved using standard herbarium techniques. A permit for collected material was not required. Taxonomy follows Mellichamp and Case (2009). Herbarium abbreviations follow Thiers (2015).

Figure 1: *Sarracenia ×naczii* flower at full anthesis.

Results and Discussion

Images of the specimen sheets for the holotype (Mellichamp *s.n.*) and isotype (Mellichamp

s.n.) of *Sarracenia* ×*naczii* were kindly supplied by the UNCC and NCU herbaria respectively. Only leaves (no flowers) are present on these sheets. From the present study, herbarium specimens (leaves only) are housed in the LSU (Neyland *2454*) and NCU (Neyland *2454*) herbaria. The single floral specimen is housed at LSU (Neyland *2481*).

From the type locality, several individuals were in bloom in 2015. The following data were derived from a single representative flower from the type locality (Fig. 1). Overall, the flower, when compared to others in the genus may be considered medium sized. For reference, the flower closely resembles in size that of *Sarracenia* ×*mitchelliana* G. Nicholson. Specifically, the calyx measured 5.5 cm wide. The sepals averaged 2.3 cm long × 1.8 cm wide. Each is ovate, and flat (not glossy) rose colored. The petals averaged 5.6 cm long × 2.1 cm wide. They are spatulate, satin textured and the same color as the sepals. A few small white spots appear on each petal. The style is 5.9 cm wide. The flower was first at full anthesis on March 30, 2015 and bore a sweet-musty scent. The scape measured 32 cm long. None of the flowers from this population appeared pale yellow as described by Mellichamp.

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Accurate labeling of Australian *Drosera* in cultivation

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Keeping up with the correct botanical names for the full roster of Australian *Drosera* has been a complex task over the past 20 years, consequently many plants in cultivation have been incorrectly labeled and continue to be so today. One need only follow the various Groups on Facebook or CP Forums to see a large number of incorrectly named taxa regularly being posted, particularly Pygmy *Drosera*, and countries where English is not the first language. This is hardly surprising given the number of new species described, subspecies being elevated to species rank, name changes for existing species, and plants entering cultivation with location names or affinities to existing species while the taxonomic work was done to ascertain their correct status. Added to this, the fact that most of this has been carried out in English and in Journals that are not always available to the hobbyist, has further clouded the issue. Since the original 3 Volume work by Allen Lowrie, Carnivorous Plants of Australia, was released, there have been a number of partial revisions of the species roster in that publication by Lowrie, a complete attempt to revise the roster by Jan Schlauer in 1996, which saw many species reduced to sub species, and a few new species described by other authors (Gibson, Schlauer, and Mann). The result of this has been confusion to say the least, even for those of us that have been following the changes closely. The release of Magnum Opus by Lowrie in 2014, has gone a long way to clearing up this confusion, with exhaustive field work, literature reviews, and herbarium studies, that have cleared up previous errors, matched the correct type material to plants that had been elusive in the field, and also ensuring that the first published name of a species stands as the correct name. The roster of names published in Magnum Opus and reproduced in this issue of CPN is at this time the most up to date. Although new species will be added from time to time, this benchmark work should set the standard that we should all follow for the correct naming of Australian *Drosera*. Below is a list of name changes as a result of Magnum Opus that are not obvious and if read in conjunction with Lowrie's roster, should clear up any confusion and allow plants in cultivation to be correctly labeled.

Former name	New name	Notes
Drosera dichrosepala	*Drosera verrucata*	The real *Drosera dichrosepala* has been recently rediscovered and is not widely in cultivation.
Drosera parvula	*Drosera minutiflora*	*Drosera parvula* was an invalid name and is now in synonymy.
Drosera paleacea subsp. *paleacea*	*Drosera micrantha*	The real *Drosera paleacea* has been recently rediscovered and is not widely in cultivation.
Drosera microphylla "white flowers"	*Drosera esperensis*	
Drosera microphylla var. *macropetala*	*Drosera calycina*	
Drosera menziesii subsp. *penicellaris*	*Drosera drummondii*	

The 241 species that appeared in Allen Lowrie's Carnivorous Plants of Australia Magnum Opus

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Keywords: Australian carnivorous plants, Australia's carnivorous plants roster, Byblidaceae, *Byblis*, Cephalotaceae, *Cepahalotus*, Droseraceae, *Aldrovanda, Drosera*, Nepentheaceae, *Nepenthes*, Lentibulariaceae, subgenus *Polypompholyx*, subgenus *Utricularia*.

Carnivorous Plants of Australia Magnum Opus. First Published: 16 December 2013 [Kew Library & Index Kewensis accessions listed as "December 2013"].

BYBLIDACEAE

1: *Byblis aquatica* Lowrie & Conran. *Nuytsia* 12 (1): 62 (1998).

Type: NORTHERN TERRITORY. "On Redcliffe Road, *ca.* 1 km north of the junction with Elizabeth Valley Road, Noonamah, Northern Territory, 12° 44' S, 131° 03' E, 28 April 1995, A. *Lowrie* 1117" (*holo*: PERTH 04658906; *iso*: DNA, MEL).

2: *Byblis filifolia* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 305 (1848).

Type: WESTERN AUSTRALIA. "in Novae-Hollandiae ora boreali occidentali. Bynoe in herb. Hook. [North west coast of New Holland [Australia], no date, *Bynoe* s. *n.* in Herb. Hook.]" (*lectotype*: K, selected by Conran, Lowrie & Moyle-Croft (2002)); single specimen on shared sheet, labeled *"B. filifolia* N.W. Coast, Australia, no date, *Bynoe s.n."* in Herb. Hook. (*isolecto*: K).

Lectotypification. The lectotype consists of four specimens 12.9 cm tall, near the top on their own sheet. The isolectotype is a single specimen of a similar height, labeled *Byblis filifolia* from the same collection of Bynoe on a shared sheet with "*B. liniflora*, Gulf of Carpentaria (remaining hand written notes unclear)" and "*B. filifolia*, Sturt's Creek, F. Mueller."

3: *Byblis gigantea* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: xxi. (1839).

Type: WESTERN AUSTRALIA. "Swan River, N [New] Holland [Western Australia], no date, Drummond *s.n."* ex Herb. Lindl. in Herb.Hook. (*lectotype*: K, here designated, left hand element; *isolectotype*: K, here designated, right hand element); Swan River. 1839. Drummond *s.n.* ex Herb. Lindl. in Herb. Benth. (*lecto*: K; *isolecto*: K).

Byblis lindleyana Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 307 (1848).

Type: WESTERN AUSTRALIA. "cum praecedente; herb. Lindl.; Drummond in herb. Hook. [Swan River. N [New] Holland [Western Australia]. no date. Drummond *s.n.*" labeled "*Byblis grandiflora*" ex Herb Lindl. in Herb. Hook. (*lecto*: K, selected by Conran, Lowrie & Moyle-Croft (2002)): Swan River. NH [New Holland. 1839, Drummond *s.n.* ex Herb. Lindl. in Herb. Benth. (*isolecto*: K).

Lectotypification. There are two Drummond *Byblis* sheets at Kew labeled *Herb Hook.*, only one of which corresponds to Planchon's description for *B. gigantea.* That specimen has two elements on the sheet, and the left hand piece has been selected as the *lectotype,* with the right hand element regarded as an *isolectotype*. The other *Herb. Hook.* sheet fits closely to Planchon's *B. lindleyana,* (named in honour of the British gardener, botanist, and pioneer Orchidologist John Lindley 1799–1865) and has thus been designated by Conran, Lowrie & Moyle-Croft as the *lectotype* for that epithet. These are listed above as *isolectotypes.*

4: *Byblis guehoi* Lowrie & Conran. *Telopea* 12 (1): 23–29, Figs 1–4 (2008) [15 Feb 2008].

Type: WESTERN AUSTRALIA. "300 metres north of Bobbys Creek, near Beagle Bay Mission, *ca.* 137 road km NE of Broome, Dampier Peninsula, Kimberley, 16°57'39"S, 122°46'26"E, *A. Lowrie 3215* & *R. Guého*, 6 September 2004 (PERTH). Isotype: MEL." (*holo*: PERTH, *iso*: MEL.).

5: *Byblis lamellata* Conran & Lowrie. *Nuytsia* 15 (1): 18 (2002). [6 Dec 2002].

Type: WESTERN AUSTRALIA. "about 4 km south of Eneabba, Western Australia, 29° 51' S, 115° 16' E, 31 October 2001, *A. Lowrie* 2731." (*holo*: PERTH 05853834; *iso*: K, MEL),

6: *Byblis liniflora* Salisb. *The Paradisus Londinensis* t. 9 (1808).

Type: "Illustration tab. 95 in Salisbury & Hooker" (loc. cit.) as *Psyche liniflora* Salisb. nom. inval.

Byblis caerulea R.Br. ex Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 306 (1848).

Type: QUEENSLAND. "in Novae-Holl. tropicae ora orientali ad Endeavour river; Banks et Soland. in herb. Mus. Brit. [Australia: Endeavour River, Queensland, *Banks & Solander s.n.*, 1770]" (*holo*: BM).

7: *Byblis pilbarana* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1268 (2013).

Type: WESTERN AUSTRALIA. "Red Rock, 10 km south of Indee Cattle Station south of Port Hedland, Pilbara, 20° 52' 29.4" S, 118°35' 22.8" E, *Allen Lowrie 4007 & Gordon Graham*, 19 July 2009" (*holo*: PERTH, *iso*: MEL.).

8: *Byblis rorida* Lowrie & Conran. *Nuytsia* 12 (1): 70 (1998).

Type: "200 metres south-south-east of Beverley Springs Station homestead, Kimberley, Western Australia, 16° 43' 05" S, 125° 27' 32" E, 8 February 1996, *R.L. Barrett* 825." (*holo*: PERTH 04658892; *iso*: DNA, MEL).

CEPHALOTACEAE

1: *Cephalotus follicularis* Labill. *Novae Hollandiae Plantarum Specimen* 2: 7, t. 145 (1806).

Type: WESTERN AUSTRALIA. "in terrâ Van-Leuwin." Re. Type, see J.H.Willis, *W. Austral. Naturalist* 10 (1965) 1–6).

DROSERACEAE

1: *Aldrovanda vesiculosa* L. *Species Plantarum* 1: 281 (1753) [1 May 1753].

Type: ITALY & INDIA. "Habitat in Italiae [Italy] & Indiae [India] paludosus [swamps]. *D. Monti*." *n.v.*

Aldrovanda vesiculosa var. *australis* Darwin. *Insectivorous Plants*: 328 (1876).

Type: "Dried leaves of this plant from Queensland in Australia were sent me by Prof. Oliver from the herbarium at Kew."

Aldrovanda vesciculosa L. var. *rubescens* A.T.Cross & L.Adamec. *Aldrovanda - The Waterwheel Plant*: 213 (2012).

Type: WESTERN AUSTRALIA: Australia, W.A., Kimberley Region, Mitchell Plateau, 20 June 1993, *Allen Lowrie 732* (*03143937*, PERTH *holo*: PERTH).

Drosera aldrovanda F.Muell. (nom. illeg.) *Fragmenta Phytographiae Australiae* 10 (85): 79 (1876) [Oct 1876].

Type: "Rockhampton, *P. O'Shanesy*" (*syn*: photo K, MEL.).

1: *Drosera aberrans* (Lowrie & Carlquist) Lowrie & Conran. *Telopea* 12 (2): 151 (2008).

Drosera whittakeri subsp. *aberrans* Lowrie & Carlquist. *Phytologia* 73 (2): 98 (1992).

Drosera whitakeri F.Muell. *The Native Plants of Victoria Succinctly Defined* 53 (1879).

Type: SOUTH AUSTRALIA. "HOLOTYPUS. AUSTRALIA. In red loam soils in mallee scrub country west and east of Sherlock, 19 July 1991, *D. E. Murfet* 1059 (PERTH); *iso*: RSA)." (*holo*: PERTH; *iso*: RSA).

2: *Drosera adelae* F.Muell. *Fragmenta Phytographiae Australiae* 4 (30): 154, t. XXXIII. (1864)

Type: QUEENSLAND. "rivum Dalrymple's Creek sinui Rockingham Bay affluentem, nec non in locis scaturiginosis montium circumjacentium. *Dallachy s.n.*" (*iso*: MEL).

3: *Drosera allantostigma* (N.G.Marchant & Lowrie) Lowrie & Conran. *Taxon* 56 (2): 538 (2007) [15 June 2007].

Drosera nitidula subsp. *allantostigma* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 325 (1992).

Drosera nitidula var. *allantostigma* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plants Newsletter* vol. 25: 73 (Sept. 1996).

Type: WESTERN AUSTRALIA. "Western Australia, Brand Highway, 1.3 km N of Hill River, in loam or sandy clay soils around the margins of wet depressions amongst low heath, *A. Lowrie* 87/056, 7/11/87 [7 November 1987] (holotypus PERTH)." (*holo*: PERTH).

4: *D. andersoniana* W.Fitzg. ex Ewart & Jean White. *Proceedings of the Royal Society of Victoria* 22 (1): 93, t. XXII, figs 1–3 (Sep. 1909).

Type: WESTERN AUSTRALIA. "Cowcowing, W. [Western] Australia, *Max Koch*, 1904. No. 1106." (*iso*: MEL, PERTH).

5: *Drosera androsacea* Diels. *Botanische Jahrbucher fur Systematik* 35 (2): 205, fig. 25 (1904) [6 Dec 1904].

Type: WESTERN AUSTRALIA. "*In distr. Stirling haud procul a visco Cranbrook in apertis glareosis flor. m. Sept. exeunte* (D. 4471)" (*lecto*: *fide* Diels, B).

SynType: WESTERN AUSTRALIA. "*In distr. Eyre pr. Hammersley River in arenosis aridis fruticulosis flor. m. Oct.* (D. 4927)." (*syn*: B, MEL, PERTH).

6: *Drosera aquatica* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1268 (2013).

Type: WESTERN AUSTRALIA. "15 km W of Kununurra, Kimberley, Western Australia, 15° 46' 15" S 128° 37' 11" E, *A. Lowrie* 1111, 26 April 1995" (*holo*: PERTH; *iso*: DNA, Herbarium Lowrieanum).

7: *Drosera arcturi* Hook. *The Journal of Botany* 1: 247 (1834).

Type: "summit of Mt Arthur Mr Gunn, (n. 139.) [Type number should read 129]" *sensu* Diels 1906 "Mount Arthur (Gunn n. 129…)" type sheet [bottom collection] hand notation "summit of Mt Arthur, Van Dn's [Diemen's] Land, 129. W. Gunn 1832" (*holo*: K 000215043).

8: *Drosera aurantiaca* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1268 (2013).

Type: WESTERN AUSTRALIA. "Grevillea Creek crossing, Beverley Springs Station, Kimberley, Western Australia, 16° 29' 23" S, 125° 21' 11" E, *Allen Lowrie* 1193, 7 June 1995" (*holo*: PERTH; *iso*: DNA; MEL; Herbarium Lowrieanum).

9: *Drosera auriculata* Backh. ex Planch. *Annales des Sciences Naturelles*: 9: 295 (1848).

Drosera peltata subsp. *auriculata* (Planch. ex Planch.) B.J. Conn. *Journal of the Adelaide Botanic Gardens* 3 (1): 98 (1981).

Type: NEW SOUTH WALES. "Australia: New South Wales: 'prope Sydney', Herb. Sieber No. 176 (K215087 - right specimen); isolecto. (K215087 - left specimen)". (*lecto*: K; *isolecto*: K, selected by Gibson, Conn & Bruhl (2012)).

10: *Drosera australis* (N.G.Marchant & Lowrie) Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1274 (2013).

Drosera occidentalis subsp. *australis* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 326 (1992).

Type: WESTERN AUSTRALIA. "Western Australia: Hopetoun-Ravensthorpe Road, 43 km S of Ravensthorpe, in sandy soils overlaying laterite, often amongst laterite pebbles, *A. Lowrie* 87/108, 16/10/1987 (holo: PERTH)" (*holo*: PERTH).

11: *Drosera* × *badgerupii* Cheek. *Kew Magazine* 10 (3): 140 (1993).

Type: WESTERN AUSTRALIA. "in hort. europ., [from plants cultivated at Wembdon, Somerset in 1989; origin Western Australia: [location erroneously recorded as Lake Badgerup by the Australian discoverer, Steve Rose, in 1977. True location is Lake Jandabup, 31° 45' 05.98" S, 115° 50' 29.48 E] *M. Cheek* 1995" (*holo*: K; *iso*: BM, PERTH, RNG).

12: *Drosera* × *badgingarra* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1273 (2013).

Drosera nitidula subsp. *allantostigma* × *D. omissa* [as *D. ericksoniae*] in A. Lowrie, *Carnivorous Plants Australia* vol. 2: 102 (1989).

Type: WESTERN AUSTRALIA. "on Brand Highway, just north of Hill River, Western Australia, 30° 17' S, 115° 19' E, 10 December 1991, *Allen Lowrie* 562" (*holo*: PERTH; *iso*: MEL).

13: *Drosera banksii* R.Br. ex DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 319 (1824) [mid Jan 1824].

Type: QUEENSLAND. "in Nova Hollandia prope Endeavour-river. (*v.s.* in h. Banks.)" (*holo*: BM. BM000752959).

14: *Drosera barbigera* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 287 (1848) [May 1848].

Type: WESTERN AUSTRALIA. "Swan River [Colony] Western Australia, *J. Drummond s.n.* [3 specimens top of sheet]". (*syntype*: K, *fide* A. Cullham 1988).

Drosera drummondii Lehm. *Plantae Preissianae* 2 (2–3): 235 (1848) [2–5 Aug 1848].

Type: WESTERN AUSTRALIA. "Ad flumen Cygnorum legit Drummond [Swan River Colony], Western Australia, *J. Drummond* [3rd collection] 34." (*lectotype*: K, *fide* Diels "Südwest-Australien: o.n.O. (Drummond coll. III. n. 34 ...)" (Diels 1906: 71,72). [sheet labeled "presented by Hugh Low Esq."]; *isolecto*: K, *fide* Marchant *et al.* (Marchant & George 1982: 60) [sheet stamped Herbarium Benthamianum, 1854]; *isolecto*: P 00749103, "W. Australia, *Drummond* (1st ? collection) No. 34, 1843 ex BM (*isolecto*: P, sheet No. 00749103, *fide* A. Lowrie).

15: *Drosera barrettorum* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1269 (2013).

Type: WESTERN AUSTRALIA. "Grevillea Creek crossing, Beverley Springs Station, Kimberley, Western Australia, 16° 29' 23" S, 125° 21' 11" E, *Allen Lowrie* 1207, 7 June 1995" (*holo*: PERTH; *iso*: DNA; MEL; Herbarium Lowrieanum).

16: *Drosera basifolia* (N.G.Marchant and Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1274 (2013).

Drosera menziesii subsp. *basifolia* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 316 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, Wongan Hills, W of the Agriculture Dept., in sandy clay in winter-wet depressions amongst low shrubs, *A. Lowrie* 12/8/84 [12 August 1984] (holotypus PERTH)." (*holo*: PERTH)

17: *Drosera bicolor* Lowrie & Carlquist. *Phytologia* 73 (2): 109 (1992).

Type: WESTERN AUSTRALIA. "In deep white silica sand between low shrubs on heathland, on floodplain of the upper Philips River, 2.3 km from the Hyden-Ravensthorpe Road, 25 Sept. 1990, *A. Lowrie* [*s.n.*] (PERTH)." (*holo*: PERTH).

18: *Drosera binata* Labill. *Novae Hollandiae Plantarum Specimen* 1: 78, t. 105 (1805).

Dismophyla binata (Labill.) Raf. *–Flora Telluriana* 3: 36 (1837) [1836 published Nov-Dec 1837]. *Type*: TASMANIA. "in capite Van-Diemen." *J.J.H. de Labillardiere* (*holo*: P, sheet number 00307177).

Drosera dichotoma Banks & Solander ex Sm. *Rees' Cyclopaedia* xii. (1809).

Type: "from New South Wales." (*holo*: *n.v.*).

Drosera billardierei Steud. [nom. inval.] *Nomenclator Botanicus Edn.* 2, 1 (5–6): 531 (1840). Name in synonymy only.

19: *Drosera bindoon* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1269 (2013).

Type: WESTERN AUSTRALIA. "*ca.* 280 m west of Reserve Road, Muchea, 31° 31' 38.07" S 115° 59' 44.13" E, *Allen Lowrie* 2160, 24 October 1998" (*holo*: PERTH *iso*: MEL; Herbarium Lowrieanum).

20: *Drosera brevicornis* Lowrie. *Nuytsia* 11 (1): 56 (1996).

Type: NORTHERN TERRITORY. "Whistle Duck Dreaming, Kakadu National Park, Northern Territory, 11 April 1990, *A. Lowrie* 56" (*holo*: PERTH 04223624; *iso*: CANB, DNA, MEL).

21: *Drosera broomensis* Lowrie. *Nuytsia* 11 (1): 57 (1996).

Type: Western Australia: "Lake Campion, northeast of Broome, Western Australia, 21 April 1995, *A. Lowrie* 1089" (*holo*: PERTH 04223675; *iso*: CANB, DNA, MEL).

22: *Drosera browniana* Lowrie & N.G. Marchant. *Nuytsia* 8 (3): 323 (1992).

Type: WESTERN AUSTRALIA. "0.9 km south of the rock cairn on Hatters Hill goldmine, 0.1 km west of the road on the summit of a granite outcrop, Western Australia, *Allen Lowrie* 99, 2/9/90" (*holo*: PERTH; *iso*: MEL, RSA).

23: *D. bulbigena* Morrison. *Transactions and Proceedings of the Botanical Society Edinburgh*: 417 (1903).

Type: WESTERN AUSTRALIA. "Coolup, Murray R. [River], (*R. Helms*). Wetflats, Lower Canning R. [River], *A. Morrison* [*s.n.*, 28 Sept. 1898]" (*syn*: K, BRI, MEL.).

24: *Drosera bulbosa* Hook. *Icones Plantarum* 4: t. 375 (1841) [6 Jul-6 Aug 1841].

Type: WESTERN AUSTRALIA. "Swan River. New Holland, *James Drummond* [*s.n.*]" (*holo*: K000215046).

25: *Drosera burmannii* Vahl. *Symbolae Botanicae* 3: 50 (1794).

Drosera burmanni DC. *Prodromus Systematis Naturalis Regni Vegetabilis* (DC.) 1: 318 (1824) [mid Jan 1824].

Type: SRI LANKA "Habitat in Zeylona." (*holo*: *n.v.*).

Drosera dietrichiana Rchb.f. *Beitrage zur Flora und Pflanzenkunde*: 73 (1871).

Drosera burmanni var. *dietrichiana* (Rchb.f.) Diels. *Das Pflanzenreich* 26: 76 (1906).

Type: none given, but Reichenbach's article is titled "Bemerkungen zu der Flora von Brisbane river."

26: *Drosera caduca* Lowrie. *Nuytsia* 11 (1): 59 (1996).

Type: WESTERN AUSTRALIA. "On the road from Beverley Springs to Pantijan, 15 km N of the Charnley River crossing (74 km N of Beverley Springs) in the Edkins Range, Kimberley, Western Australia, 16° 03'S, 125° 23'E, January 1995, *R. & M. Barrett s.n.*"(*holo*: PERTH 04223640; *iso*: CANB, DNA, MEL).

27: *Drosera callistos* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 321 (1992).

Type: WESTERN AUSTRALIA. "Chidlow-York Road (Great Southern Highway) 15 km E of Great Eastern Highway, in laterite soil, *A. Lowrie* 83/038, 9/10/83 [9 October 1983] (holotypus PERTH)." (*holo*: PERTH).

28: *Drosera calycina* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 299 (1848).

Type: WESTERN AUSTRALIA. "Drummond in herb. Hook. et Soc. Linn. Londres". (*holo*: MPU;

iso: K000215039 [two larger specimens, annotated "J. Drummond, Swan River" left side of sheet]).

Drosera calycina var. *minor* Benth. *Flora Australiensis* 2: 469 (1864).

Type: WESTERN AUSTRALIA. "Between Moore and Murchison Rivers, *Drummond* 6th Coll. n. 110." (*holo*: K000215038, K; *iso*: MEL).

Drosera microphylla var. *macropetala* Diels. *Das Pflanzenreich* 26: 121 (1906).

Type: WESTERN AUSTRALIA. "Südwest-Australien: zwischen Moore River und Murchison River (*Drummond* coll. VI. n. 109 – Original der Varietät!)." (*holo*: K000215038, [numbered as 110] K; iso: MEL).

29: *Drosera* × *carbarup* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1273 (2013).

Type: WESTERN AUSTRALIA. "Carbarup, beside railway line, 34° 33' 58.56" S, 117° 41' 52.23" E, 10 October 2001, *Allen Lowrie* 2733." (*holo*: PERTH; *iso*: MEL).

30: *Drosera citrina* Lowrie & Carlquist. *Phytologia* 73 (2): 99 (1992) [7 October 1992].

Type: WESTERN AUSTRALIA. "in deep yellow sand between low shrubs on Brand Highway, 24 km S of Regan's Ford, 9 October 1983, *A.Lowrie* 83/011 (PERTH; Iso: RSA)." (*holo*: PERTH, *iso*: RSA).

Drosera chrysochila Schlauer. *Der Palmengarten* 3/92: 190 (1992) [12 October 1992].

Type: "[origin Western Australia via A. Lowrie to Hennern] ex. cultivation. Hennern, *Schlauer* 536" (*holo*: FRP).

31: *Drosera closterostigma* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 322 (1992).

Type: Western Australia: "Western Australia, Brand Highway, 15 km N of Gingin turnoff, in sandy soils under and between low shrubs around the margins of wet depressions, *Allen Lowrie* 83/046, 4/11/83 [4 November 1983] (holotypus PERTH." (*holo*: PERTH).

32: *Drosera coalara* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1269 (2013).

Type: WESTERN AUSTRALIA. "NE of Badgingarra (precise location with held), 11 September 2007, *Allen Lowrie* 3556 & *John G. Conran* (*holo*: PERTH; *iso*: AD, MEL).

33: *Drosera collina* (N.G.Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1275 (2013).

Drosera erythrorhiza subsp. *collina* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 317 (1992).

Type: WESTERN AUSTRALIA. "Darling Range E of Perth on O'Brien Road, 5 km N of Toodyay Road, in loam-laterite soils in jarrah forest, *A. Lowrie* 84/081, 10 June 1984 (holotypus PERTH)." (*holo*: PERTH).

34: *Drosera coomallo* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1269 (2013).

Type: WESTERN AUSTRALIA. "Coomallo telephone exchange, Marchagee Track, 27 September 2000, *Allen Lowrie* 2478." (*holo*: PERTH; *iso*: AD, MEL).

SynType: "*In distr*. Irwin *pr*. Arrowsmith River (F. V. MULLER)." (*syn*: B ??, MEL).

35: *Drosera cucullata* Lowrie. *Carnivorous Plants of Australia Magnum Opus,* Appendix: 1270 (2013).

Type: WESTERN AUSTRALIA. "Gibb River Rd, N of Adcock Gorge, Kimberley, Western Australia, 16° 53' 59" S, 125° 47' 02" E, *Allen Lowrie* 2542K, 5 August 2000" (*holo*: PERTH *iso*: DNA; MEL; Herbarium Lowrieanum).

36: *Drosera darwinensis* Lowrie. *Nuytsia* 11 (1): 61 (1996).

Type: NORTHERN TERRITORY. "0.9 km south of Temple Avenue, Palmerston, Northern Territory, Australia, 8 April 1990, *A. Lowrie* 49." (*holo*: PERTH 04223659; *iso*: CANB, DNA, MEL).

37: *Drosera depauperata* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1270 (2013).

Type: WESTERN AUSTRALIA. "southern shores of Lake Pleasant View, E of Manypeaks 34° 50' 01" S, 118° 10' 56" E, 16 November 2001, *Allen Lowrie* 2734." (*holo*: PERTH; *iso*: MEL).

38: *Drosera derbyensis* Lowrie. *Nuytsia* 11 (1): 63 (1996).

Type: "Silent Grove camping area, Kimberley, Western Australia, 5 June 1995, *A. Lowrie* 1182." (*holo*: PERTH 04223667; *iso*: DNA, MEL).

39: *Drosera dichrosepala* Turcz. *Bulletin de la Société des Naturalistes de Moscou* 27 (4): 343 (1854).

Drosera scorpioides var. *brevipes* Benth. *Flora Australiensis* 2: 460 (1864).

Type: WESTERN AUSTRALIA. "Nova Hollandia. Drum. Coll. V. n. 284.", [*James Drummond* 284, no date, two groups with same collection number, on same sheet, upper group of three specimens labeled "Swan River to Cape Riche" and stamped "Herbarium Benthamianum 1854" K000215090,

the lower group of 4 specimens labeled "Swan River" and stamped "Herbarium Hookerianum 1867." K000215049 (*iso*: K).

40: *Drosera dilatatopetiolaris* K.Kondo. *Boletim da Sociedade Broteriana* 57: 52, figs 1, 2, 3 (1984).

Type: NORTHERN TERRITORY. "AUSTRALIA. NORTHERN TERRITORY. Howard River Estuary, near Darwin, February 6, 1982, *D.Falconer s.n.* [Holotype: Herbarium of Faculty of Integrated Arts and Sciences, Hiroshima University (Kondo 2234); Isotypes: NCU, NY, NSW, BRI]." (*holo*: Hiroshima University; *iso*: NCU, NY, NSW, BRI).

41: *Drosera drummondii* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 293 (1948) [May 1848].

Type: WESTERN AUSTRALIA. "cum praecedente; Drummond in herb. Hook"

Drosera penicillaris Benth. *Flora Australiensis* 2: 467 (1864) [October 1864]. *Lectotype*: Western Australia: "Drummond coll. III. n. 44."

Drosera menziesii var. *penicillaris* (Benth.) Diels. *Das Pflanzenreich* 26: 117 (1906).

Drosera menziesii subsp. *penicillaris* (Benth.) N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 319 (1992).

Type: WESTERN AUSTRALIA. "SW Western Australia, *J.Drummond s.n.*" (*lectotype*: *fide* Diels 1906; *isotype*: K000215059, *fide* Marchant & George (1982).

42: *Drosera echinoblastus* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 322 (1992).

Type: WESTERN AUSTRALIA. "In sandy soils between and under low shrubs on heathland on Brand Highway, 1.7 km north of Hill River, *Allen Lowrie* 87/052, 2/11/87 [2 November 1987] (holotypus PERTH)." (*holo*: PERTH).

43: *Drosera eneabba* N.G.Marchant & Lowrie. *Kew Bull.* 47 (2): 322 (1992).

Type: WESTERN AUSTRALIA. on Jurien Road East, 27.9 km W of Brand Highway in white silica sand soils on low open heathland, 2 November 1987, *A. Lowrie* 87/053 (*holo*: PERTH).

44: *Drosera enodes* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 323 (1992).

Drosera dichrosepala subsp. *enodes* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 72 (1996).

Type: WESTERN AUSTRALIA. "Western Australia, NE of Augusta, at the junction of Courtney Road and Scott River Road, in black peaty sand on the margins of swamps, *A. Lowrie* 83/049, 9/11/83, (holotypus PERTH)." (*holo*: PERTH).

45: *Drosera eremaea* (N.G.Marchant & Lowrie) Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1275 (2013).

Drosera macrantha subsp. *eremaea* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 318 (1992).

Drosera stricticaulis subsp. *eremaea* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 73 (1996).

Sondera eremaea (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 43 (2000).

Type: WESTERN AUSTRALIA. "Western Australia, 30 km S of Mt Magnet, in quartz grit and loam soils in winter-wet creeks and in open ground, *A. Lowrie* 84/072, 1/7/84 [1 July 1984] (holotypus PERTH)." (*holo*: PERTH).

46: *Drosera erythrogyne* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 316 (1992).

Sondera erythrogyne (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Western Australia, *ca.* 20 km NW of Walpole, by southwestern Highway, in gritty loam on granite outcrop aprons, *A. Lowrie* [*s.n.*] 16/9/85 (holotype PERTH)." (*holo*: PERTH).

47: *Drosera erythrorhiza* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: xx (1839) [1 Dec. 1839].

Type: WESTERN AUSTRALIA. "south Western Australia", *J. Drummond s.n.*(*holo*: CGE).

Drosera primulacea Schlotth. *Bonplandia*: 110 (1856).

Type: WESTERN AUSTRALIA. "Schedula Preissiana Nr. 1987. In arenosis umbrosis sylvae prope oppidulum 'Perth' die 13. Maji a. 1839 L. Preiss legit." (*iso*: P, sheet P00749105).

48: *Drosera esperensis* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1270 (2013).

Type: WESTERN AUSTRALIA. "Cape Le Grand, east of Esperance, 33° 58' 14" S, 122° 10' 04" E, *Allen Lowrie* 2566, 31 August 2000." (*holo*: PERTH; *iso*: MEL).

49: *Drosera falconeri* K.Kondo. *Boletim da Sociedade Broteriana* 57: 52, figs 1, 2, 3 (1984).

Type: NORTHERN TERRITORY. "AUSTRALIA. NORTHERN TERRITORY. a small population along the Fennis [Finniss] River, April 28, 1982, *D. Falconer s.n.* Holotype: Herbarium of Faculty of Arts and Sciences, Hiroshima University (Kondo 2227); *Isotypes*: NCU, NY, NSW, BRI." (*holo*: Hiroshima University; *iso*: NCU, NY, NSW, BRI).

50: *Drosera fimbriata* DeBuhr. *Aliso* 8 (3): 267 (1975).

Type: WESTERN AUSTRALIA. "18 miles [28.8 km] north-east of Manypeaks along road to Jerramungup, 14 October 1974, *DeBuhr* 4098." (*holo*: RSA; *iso*: CANB, K, PERTH, US).

51: *Drosera finlaysoniana* Wall. ex Arn. *Companion to the Botanical Magazine* 2 (1837).

Type: VIETNAM. "Turon Bay, Cochinchina [Đa Nẵng Bay, Vietnam], *G. Finlayson* 507, [*Wallich* Cat. No. 3752]" (*holo*: G; *iso*: K 000217501, K 000659132).

Drosera angustifolia F.Muell. *Transactions of the Philosophical Society of Victoria* 1: 7 (1854).

Type: VICTORIA. "On the moist gravelly margins of the Lakes on the Murray River towards Eustone [Euston, N.S.W.]." (*holo*: MEL 659388).

Drosera indica f. *robusta* F.M.Bailey. *Queensland Agricultural Journal* 31: 115, t. 100 (1913).

Type: QUEENSLAND. "Mill Stream Falls, Ravenshoe, *E.W. Bick.* (June, 1913)."

52: *Drosera fragrans* Lowrie. *Carnivorous Plants of Australia Magnum Opus,* Appendix: 1271 (2013).

Type: WESTERN AUSTRALIA. "east bank of Lily Creek, Kununurra, Kimberley, Western Australia, 15° 46' 40" S, 128° 45' 02" E, *Allen Lowrie* 2542K, 8 August 2000" (*holo*: PERTH; *iso*: MEL, DNA, Herbarium Lowrieanum).

53: *Drosera fulva* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 289 (1848).

Type: NORTHERN TERRITORY. "in Nova-Hollandia tropicali verosimiliter ad Port-Essington orae boreal. occid., *Armstrong* [*s.n.*] in herb. Hook." (*iso*: K).

54: *Drosera geniculata* (N.G.Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix 1275 (2013).

Drosera gigantea subsp. *geniculata* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 316 (1992).

Drosera gigantea var. *geniculata* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plants Newsletter* vol. 25, p. 73, Sept. (1996).

Type: WESTERN AUSTRALIA. "Western Australia, *ca.* 2 km N of Brennans Ford, on Scott River Road, in black sandy soil on margins of swamps on higher ground than average water level, *A. Lowrie s.n.* 16/9/84 [16 September 1984]" (*holo*: PERTH).

55: *Drosera gibsonii* P.Mann. *Nuytsia* 16 (2): 321 (2007).

Type: WESTERN AUSTRALIA. "Stirling Range National Park, Western Australia, 11 November 2006, *P. Mann* 06/001" (*holo*: PERTH 07220731; *iso*: CANB, K, UNE).

56: *Drosera gigantea* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: 20 (1839).

Type: WESTERN AUSTRALIA. "Swan River, *J. Mangles s.n.*" (*iso*: CBE).

57: *Drosera glabriscapa* Lowrie. *Carnivorous Plants of Australia Magnum Opus,* Appendix: 1271 (2013).

Type: WESTERN AUSTRALIA. "beside Grevillea Creek, Synnot Range, *ca.* 25 km north west of Beverley Springs Homestead, Kimberley, Western Australia, 16° 29' 20.69" S, 125° 21' 08.21" E, *Russell L. Barrett* 581, 18 April 1993" (*holo*: PERTH *iso*: MEL, DNA, K, Herbarium Lowrieanum).

58: *Drosera glanduligera* Lehm. *Novarum et Minus Cognitarum Stirpium Pugillus* 8: 37 (1844).

Drosera patellifera Planch. [nom. inval., pro. syn.]. *Annales des Sciences Naturelles; Botanique.* Series 2–10 ser. 3, 9: 206 (1848).

Drosera patellifera (Planch.) Diels. [nom. inval., pro. syn.]. *Das Pflanzenreich* 26: 76 (1906).

Drosera anagallidiflora F.Muell. [nom. inval.] nom. nud. *First General Report of the Government Botanist on the Vegetation of the Colony. Victoria - Parliamentary Papers- Votes and Proceedings of the Legislative Assembly*: 9.

Type: WESTERN AUSTRALIA. "*Crescit in solo sublimoso inter frutices*. 'Perth' (Herb. Preiss. No. 1976." (*iso*: MEL.).

59: *Drosera gracilis* Hook. *f.* ex Planch. *Annales des Sciences Naturelles*: 297 (1848).

Drosera peltata var. *gracilis* (Planch.) Benth. *Flora Australiensis* 2: 465 (1864).

Type: TASMANIA. "in insula Van Diemen, loco dicto Formosa, ad Arthur's lake alt. 3388 ped., Hampshire hills; *Gunn*, no. 784, forsan etiam in Novae Cambriae crescit; quippe specimina vidi in herb. Smith cum *D. peltata* commixta." (*holo*: K, *iso*: HO).

60: *Drosera graniticola* N.G.Marchant. *Flora of Australia* 8: 383, 31 (1982).

Sondera graniticola (N.G.Marchant) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 43 (2000).

Type: Western Australia: "Holt Rock, SE of Hyden, W.A., 24 Aug. 1972. N.G.Marchant 72/635; holo: PERTH; iso: CANB, K.". (*holo*: PERTH; *iso*: CANB, K).

61: *Drosera grievei* Lowrie & N.G.Marchant. *Nuytsia* 8 (3): 328 (1992).

Type: WESTERN AUSTRALIA. "At the east end of Baanga Hill road, near the junction of Sennetts Lake Road, *ca.* 20 km east of Lake King township, Western Australia, *Allen Lowrie s.n.* 25/9/89 [25 September 1989]" (*holo*: PERTH, *iso*: MEL).

62: *Drosera hamiltonii* C.R.P.Andrews (as 'Hamiltoni'). *Journal and Proceedings of the Royal Society of Western Australia* 1 (11): 81 (1903).

Type: WESTERN AUSTRALIA. "I found this plant, in December, 1902, flowering in good quantity in a large swamp, about 1.5 miles [*ca.* 2 km] North of Albany, in company with Dr. Diels new species of *Microtis* [orchid] [C.R.P.Andrews *s.n.*]" (*iso*: K, NSW, PERTH).

63: *Drosera hartmeyerorum* Schlauer. *Carnivorous Plant Newsletter* 30 (4): 104 (2001).

Type: WESTERN AUSTRALIA. "Ord River region near Kununurra, W.A. Australia, S. Hartmeyer & I. Hartmeyer *s.n.*, 30 April 2001 (Herbarium J.Schlauer – HOLO, K – ISO." (*holo*: Herbarium J.Schlauer [Germany]; *iso*: K).

64: *Drosera helodes* N.G.Marchant & Lowrie. *Kew Bull.* 47 (2): 324 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, Great Northern Highway, *ca.* 3 km N of Bullsbrook, in sandy soils mixed with laterite in winter wet depressions, *A. Lowrie* 83/045, 22/11/83 [22 Nov. 1983]" (*holo*: PERTH).

65: *Drosera heterophylla* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: xx. (1839).

Type: WESTERN AUSTRALIA. "Swan River, W.A., *J. Drummond s.n.*" (*holo*: CBE). ref. Marchant & George (1982); "Süd West-Australien: o.n.O. (Drummond (1839)…)" (*lecto*: B?). *fide* Diels (1906). No type cited by Lindley.

Sondera macrantha Lehm. *Novarum et minus cognitarum stirpium pugillus 8*: 45 (1844).

Type: WESTERN AUSTRALIA. "Habitat in solo turfoso-arenoso planitiei prope oppidulum Albany (Herb. Preiss. no. 1979)".

Sondera preissii Lehm. *Novarum et Minus Cognitarum Stirpium Pugillus*: 45 (1844) [Apr 1844].

Type: WESTERN AUSTRALIA. "Crescit prope oppidulum Perth in locis depressis ex siccatis ad fluvium Cygnorum (Herb. Preiss. no. 1989)." (*iso*: MEL, S).

66: *Drosera hirsuta* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1271 (2013).

Type: WESTERN AUSTRALIA. "on Brand Highway, north of Eneabba, 29° 39' 43" S, 115° 13' 36" E, 12 August 2003, *Allen Lowrie* 2790." (*holo*: PERTH; *iso*: MEL).

67: *Drosera hookeri* R.P.Gibson, B.J.Conn & Conran. *Journal of the Adelaide Botanic Gardens* 24: 41 (2010).

Drosera foliosa Hook. *f.* ex Planch. *Annales des Sciences Naturelles*: 298 (1848). [nom. illeg.]

Drosera peltata var. *foliosa* (Hook. *f.* ex Planch.) Benth. *Flora Australiensis* 2: 465 (1864).

Type: TASMANIA. "in insula Van Diemen loco dicto Formosa; *R.C. Gunn.,* no. 1027, 7 Dec. 1842" (*lecto*: K215054 (top row, middle specimen); *isolecto*: K (remaining specimens of K215054) [selected by Gibson, Conn & Conran (2010)]).

68: *Drosera huegelii* Endl. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 6 (1837) [Apr 1837].

Sondera huegelii (Endl.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "King Georges Sound. (Hüegel.)", [Hüegel was at King Georges Sound from 1–12 Jan. 1834, no precise location, date or number was recorded for this gathering.] (*holo*: W).

Drosera filipes Turcz. *Bulletin de la Societe Imperiale des Naturalistes de Moscou* 27 (4): 344 (1855).

Type: "Nova Hollandia. Drum. V n. 280."

69: *Drosera humilis* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 300 (1848).

Drosera stolonifera var. *humilis* (Planch.) Diels. *Das Pflanzenreich* 26: 126 (1906).

Drosera stolonifera subsp. *humilis* (Planch.) N.G.Marchant. *Flora of Australia* 8: 384 (1982).

Sondera humilis (Planch.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "cum praecedente; Drummond in herb. Hook. [south-west Western Australia, *J. Drummond s.n.*]" (*iso* K).

70: *Drosera hyperostigma* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 324 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, O'Brien Rd, *ca.* 6 km north of Toodyay Rd, in laterite and silica sand soils in open forest, *A. Lowrie* 83/012, 8/11/83 [8 November 1983] (holotypus PERTH)." (*holo*: PERTH).

71: *Drosera indumenta* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1272 (2013).

Type: WESTERN AUSTRALIA. "Nicholson Rd, Yarloop, 32° 57' 40" S, 115° 49' 49" E, 28 September 2003, *Allen Lowrie* 2856." (*holo*: PERTH; *iso*: MEL).

72: *Drosera intricata* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 293 (1848).

Type: WESTERN AUSTRALIA. "cum praecedente; Drummond in herb, Hook. [southwest Western Australia, *J. Drummond* 2nd coll. 7, in herb. Hook.]" (*holo*: K).

Drosera menziesii var. *flavescens* Benth. *Flora Australiensis* 2: 468 (1864).

Type: WESTERN AUSTRALIA "W. Australia, Drummond, 2nd Coll. n. 7; Hill and Vasse rivers, Oldfield. [southwest Western Australia, *J. Drummond* 2nd coll. 7, in herb. Hook.]" (*syn*: [Vasse River collection] K).

73: *Drosera kenneallyi* Lowrie. *Nuytsia* 10 (3): 420 (1996).

Type: WESTERN AUSTRALIA. "9 km N of mining camp on track to Port Warrender, Mitchell Plateau, N. Kimberley, Western Australia, lat. 14°46' S 125°48' E, *K.F.Kenneally* 8658, 7 December 1982." (*holo*: PERTH 01612808; *iso*: CANB, MEL).

74: *Drosera lanata* K.Kondo. *Boletim da Sociedade Broteriana* 57: 52 (1984).

Type: QUEENSLAND. "Near Mareeba, Cape York Peninsula, March 28, 1982, leg. *P.S. Lavarack s.n.* [Holotype: Herbarium of Faculty of Integrated Arts and Sciences, Hiroshima University (*Kondo* 2149)]." (*holo*: Hiroshima University).

Drosera petiolaris var. *conferta* Domin. *Bibliotheca Botanica* Heft 89: 147, (Jan. 1926).

Type: QUEENSLAND. "Queensland: Savannenwälder bei Mareeba Sowie Bei Chillagoe auf halbnackten Stellen in Gessellschaft zahlreicher Annuellen (DOMIN II. 1910)." (*holo*: *n.v.*).

75: *Drosera lasiantha* Lowrie & Carlquist. *Phytologia* 73 (2): 100 (1992).

Type: WESTERN AUSTRALIA. "In loamy laterite soils on open areas with dwarf jarrah (*Eucalyptus marginata*) woodland on the higher scree slopes, top of crest, west end of the Porongurup Range, Porongurup, 25 November 1991, *Allen Lowrie* 523 (PERTH); Isotype: RSA" (*holo*: PERTH; *iso*: RSA).

76: *Drosera* × *legrandii* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1274 (2013).

Type: WESTERN AUSTRALIA. "Cape Le Grand, east of Esperance, 33° 55' 15" S, 122° 10' 34" E, 20 December 1997, *Allen Lowrie* 2007B." (*holo*: PERTH; *iso*: MEL).

77: *Drosera leioblastus* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 325 (1992).

Drosera paleacea subsp. *leioblastus* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plants Newsletter* vol. 25, p. 73, Sept. (1996).

Type: WESTERN AUSTRALIA. "Western Australia, Brand Highway, 14.3 km NW of Cataby, in silica sand soils mixed with leaf litter humus under and between low heath, *A. Lowrie* 85/084, 29 September 1985 (holotypus PERTH)." (*holo*: PERTH).

78: *Drosera leucoblasta* Benth. *Flora Australiensis* 2: 458 (1864) [5 Oct 1864].

Type: WESTERN AUSTRALIA. "Drummond 2nd Coll. n. 14" (*syn*: K); "dry sandy flats, Kalgan river, *A. Oldfield s.n.*" (*syn*: MEL).

Lectotype: WESTERN AUSTRALIA. "Südwest-Australien: o. n. o (Drummond II. Coll. n. 12…)" (*fide* Diels 1906: 70). (*lecto*: MEL).

79: *Drosera leucostigma* (N.G.Marchant & Lowrie) Lowrie & Conran. *Taxon* 56 (2): 539 2007 [15 Jun. 2007].

Drosera nitidula subsp. *leucostigma* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 325 (1992).

Drosera nitidula var. *leucostigma* (N.G. Marchant & Lowrie) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 73 (Sept. 1996).

Type: WESTERN AUSTRALIA. "Western Australia, Brand Highway, 14.3 km NW of Cataby, in sandy soils on the margins of wet depressions, *A. Lowrie* 87/058, 7/11/87 [7 November 1987] (holotypus PERTH)." (*holo*: PERTH).

80: *Drosera lowriei* N.G.Marchant. *Kew Bulletin* vol. 47 (2): 318 (1992).

Sondera lowriei (N.G.Marchant) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Western Australia, Purnta Rock, near Hyden-Ravensthorpe Rd, in loam soils covered with moss on the aprons of granite outcrops in the wet zones *A. Lowrie* [*s.n.*] 12 September 1984 (*holo*: PERTH)".

81: *Drosera lunata* Buch.-Ham. Ex DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 319 (1824).

Drosera lobbiana Turcz. *Bulletin de la Societe Imperiale des Naturalistes de Moscou* 27 (4): 343 (1855).

Drosera peltata var. *lunata* (Buch.-Ham. ex DC.) C.B.Clarke. *The Flora of British India* 2 (5): 423–425 (1878).

Drosera peltata var. *typica* C.B.Clarke. *The Flora of British India* 2 (5): 424–425 (1878);

Drosera nipponica Masam. *Transactions of the Natural History Society of Taiwan* 23: 207 (1933);

Drosera muscipula Royle. *Illustrations of the Botany and other branches of the Natural History of the Himalayan Mountains & the Flora of Cashmere 1* 1: 75 (1839).

Drosera lunulata Matsum. *Index Plantarum Japonicarum* (1912).

Drosera insolita Taton. *Bulletin du Jardin Botanique de l'Etat a Bruxelles* 17: 307–308 (1945).

Drosera peltata var. *nipponica* (Masam.) Ohwi ex E.Walker. *Flora of Okinawa and the Southern Ryukyu Islands*: 506 (1976).

Drosera peltata var. *multisepala* Y.Z.Ruan. *Acta Phytotaxonomica Sinica* 8: 341–343 (1981);

Drosera peltata var. *glabrata* Y.Z.Ruan. *Acta Phytotaxonomica Sinica* 8: 343–344 (1981).

Type. NEPAL. "in Indiâ Orientali circa Sembu., *Buchanan s.n.,* 19 July 1802 (BM725951)" (*lecto*: BM; selected by Gibson, Conn, & Bruhl (2012))

82: *Drosera macrantha* Endl. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 6 (1837) [Apr 1837].

Sondera macrantha (Endl.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: Western Australia: "Perth ad Swan River (Hügel. [*s.n.*])." (*holo*: ?W; *iso*: W) *fide* Marchant & George 1982: 36. "Swan River (Hügel. n. 54..." (*lecto*: ?B) *fide* Diels 1906: 118.

Drosera macrantha var. *burgesii* Diels. *Das Pflanzenreich* 26: 118 (1906).

Type: "Südwest-Australien: o.n.O. (Burges [*s.n.*]-Original der Varietät)." (*holo*: ?B).

83: *Drosera macrophylla* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: xx (1839).

Sondera macrophylla (Lindl.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Südwest-Australien: o.n.O. (Drummond coll. III. n. 40 – Original der Art!)." [no type cited by Lindley, (Drummond coll. III. n. 40…) selected as *lectotype* by Diels 1906: 124.] (*lecto*: CGE).

84: *Drosera magna* (N.G.Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1275 (2013).

Drosera erythrorhiza subsp. *magna* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 317 (1992).

Sondera magna (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Brand Highway near Muart Bay turn-off, in deep sandy soils on heathland, *A. Lowrie* 84/062, 2 September 1984 (holotypus PERTH)." (*holo*: PERTH).

85: *Drosera major* (Diels) (N.G.Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1276.

Drosera bulbosa var. *major* Diels. *Das Pflanzenreich* 26: 126 (1906).

Drosera bulbosa (Hook.) subsp. *major* (Diels) N.G.Marchant & Lowrie. Kew Bull. 47 (2): 315 (1992).

Drosera species 2 var. *major* (Diels) Erickson. *Plants of Prey in Australia.* Lamb Paterson, Perth. 28 (1968).

Type: Western Australia: "Südwest-Australien: im Irwin-Gebiet bei Mingenew am lehmigen Ufer einer Wasserfurche, blühe und ver Anfang Juni (Diels n.

3033– Original der Art!)." [south-west Western Australia: Irwin district near Minenew, beginning of June, *Diels* 3033] (*holo*: *n.v.*).

86: *Drosera mannii* Cheek. *Phytologia* 68 (2): 86 (1990).

Type: WESTERN AUSTRALIA. "Australia. West Australia: [no date], *Cheek* 2064 [from European cultivated material]" (*holo*: K; *iso*: PERTH, CANB, P).

Drosera manniana N.G.Marchant. *nom. nud.,* presented without Latin description as "publication in preparation" in *Carnivorous Plants of Australia* 2: 78 (1989).

87: *Drosera marchantii* DeBuhr. *Aliso* 8 (3): 263 (1975).

Type: WESTERN AUSTRALIA. "14 miles [22 km] north of Bunbury along road to Waroona, W.A. *L. DeBuhr* 3491, 5 Sept. 1974" (*holo*: RSA; *iso*: B, CANB, E, K, US; NSW, PERTH).

88: *Drosera menziesii* R.Br. ex DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 319 (1824) [mid Jan 1824].

Drosera menziesii var. *menziesii* Benth. *Flora Australiensis* 2: (1864).

Drosera menziesii subsp. *menziesii* N.G.Marchant. *Flora of Australia* 8: (1982).

Sondera menziesii (R.Br. ex DC.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "in Novâ-Hollandiâ. (*v.s.*)".

Lectotype: "King George Sound, W.A., *A. Menzies s.n.*" (*lecto*: K, *fide* Diels 1906; *iso*: *fide* Marchant & George 1982).

Drosera filicaulis Endl. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 6 (1837) [Apr 1837].

Type: WESTERN AUSTRALIA. "King Georges Sound, W.A., *Hügel s.n.*" (*iso*: W).

89: *Drosera micra* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1272 (2013).

Type: WESTERN AUSTRALIA. "Marshall Road, Malaga, Western Australia, 31° 51' 20.62" S, 115° 54' 44.73" E, *Allen Lowrie* 4241, 21 Jan. 2012." (*holo*: PERTH, *iso*: MEL, K).

90: *Drosera micrantha* Lehm. *Novarum et Minus Cognitarum Stirpium Pugillus* 8: 39 (1844) [Apr 1844].

Type: WESTERN AUSTRALIA. "Rarissime occurrit in locis arenosis prope oppidulum Perth. (Herb. Preiss. No. 1995)." (*iso*: MEL, S.).

91: *Drosera microphylla* Endl. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 6 (1837).

Sondera microphylla (Endl.) Chrtek & Slavikova *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "King Georges Sound. (Hügel.)", [Hüegel was at King Georges Sound from 1–12 Jan. 1834, no precise location, date or number was recorded for this gathering.] (*holo*: W).

92: *Drosera microscapa* Debbert *Mitteilungen der Botanischen Staatssammlung Munchen* 30: 377 (1992).

Drosera occidentalis var. *microscapa* (Debbert) Schlauer *Carnivorous Plant Newsletter* 25 (3): 73 (1996).

Type: WESTERN AUSTRALIA. "Südküste von Westaustralien. *Debbert* 94." (*holo*: M; *iso*: B).

93: *Drosera miniata* Diels *Botanische Jahrbucher fur Systematik* 35 (2): 206, fig. 26 (1904) [6 Dec 1904].

Type: WESTERN AUSTRALIA. "in distr. Darling supra Perth pr. Swanview in collibus lapidoso-glareosis flor. m. Sept. (D. 4538)" (*lectotype*: B, *fide* Diels 1906).

SynType: WESTERN AUSTRALIA. "In distr. Irwin pr. Arrowsmith River (F. V. MÜLLER)." (*syn*: B?, MEL, for *Drosera coomallo*, *fide* Lowrie 2013).

94: *Drosera minutiflora* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 286 (1848) [May 1848].

Type: WESTERN AUSTRALIA. "in colonia fluminis Cygnorum [Swan River Colony], Drummond in herb. Hook.", no date, *J. Drummond s.n.* (*holo*: K).

95: *Drosera modesta* Diels. *Botanische Jahrbucher fur Systematik* 35 (2): 209 (1904).

Type: WESTERN AUSTRALIA. "in distr. Stirling ad locum quem vocant 'Pass' in umbrosis subhumidis flor. m. Oct. (D. 4637)." [Stirling Pass, Stirling Range, W.A., *L.Diels* 4637] (*iso*: B).

96: *Drosera monantha* (Lowrie & Carlquist). Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1276 (2013).

Drosera macrophylla subsp. *monantha* Lowrie & Carlquist. *Phytologia* 73 (2): 111 (1992).

Type: WESTERN AUSTRALIA. "Holotype: AUSTRALIA. In loam soils that dry out to become hard in summer, near truck bay on the north side of the York-Merredin Highway near Eujinyn, *ca.* 5 km west of Bruce Rock, 11 August 1990, *Allen Lowrie* 100 (PERTH); isotype: RSA." (*holo*: PERTH; *iso*: RSA).

97: *Drosera monticola* (Lowrie & N.G.Marchant). Lowrie. *Nuytsia* 21 (3): 152 (2011)

D*rosera stolonifera* subsp. *monticola* Lowrie & N.G.Marchant. *Nuytsia* 8 (3): 326 (1992).

Drosera monticola (Lowrie & N.G.Marchant.) Lowrie [comb. nov., nom. inval.]. *Nuytsia* 15 (3): 365–367, Figs 3, 11, 14 (2005). This name at this time was invalid because the reference to the basionym was indirect, as the pagination of the whole publication was given rather than an exact beginning page reference.

Type: Western Australia: "Summit of Toolbrunup Peak, Stirling Range National Park, Western Australia, 14 November 1989, *P. Mann s.n.* (*holo*: PERTH 02642964)." (*holo*: PERTH).

98: *Drosera moorei* (Diels) Lowrie. *Nuytsia* 13 (1): 80 (1999).

Drosera subhirtella subsp. *moorei* (Diels) N.G.Marchant. *Flora of Australia* 8: 385 (1982).

Drosera subhirtella var. *moorei* Diels. *Das Pflanzenreich* 26: 119 (1906)

Type: WESTERN AUSTRALIA. "Inneres Südwest-Australien: Coolgardie bei den Nine-mile rocks; Bullabulling, blüh in September (Spencer Moore – Original der Varietät!)." [Nine-mile Rocks near Coolgardie, Western Australian Goldfields, Western Australia, September 1895, *S. Moore s.n.*" (*lecto*: K, (designated by Lowrie 1999)); "Bullabulling, Western Australia, September 1895, *S. Moore s.n.*" (*paralecto*: K).

99: *Drosera murfetii* Lowrie & Conran. *Journal of the Adelaide Botanic Gardens* 27: 7–21 (2013).

Type: TASMANIA. "shores of Lake Esperance, Hartz Mountains, Tasmania, 43° 13' 44" S, 146° 46' 14" E, *Allen Lowrie* 3181 & *Denzel E. Murfet*, 24 Jan. 2006." (*holo*: TAS. *iso*: PERTH, MEL, AD, NSW).

100: *Drosera myriantha* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 291 (1848).

Sondera myriantha (Planch.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "in Novae-Holl. extratrop. ora orientali ad flumen Cygnorum; Drummond in herb. Hook. [Swan River, W.A., *J. Drummond s.n.*]" (*holo*: MPU; *iso*: K)

101: *Drosera nana* Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1272 (2013).

Type: NORTHERN TERRITORY. "on Fog Bay Rd, Dundee Downs, 12° 48' 10.8" S, 130° 29' 59.3" E, *Allen Lowrie* 4330 & Denzel Murfet, Richard Nunn, Greg Bourke, 16 April 2013" (*holo*: PERTH *iso*: MEL; DNA; NSW; K; Herbarium Lowrieanum).

102: *Drosera neesii* Lehm. *Novarum et Minus Cognitarum Stirpium Pugillus* 8: 42 (1844) [Apr. 1844].

Drosera neesii var. *neesii* (Lehm.) Benth. *Flora Australiensis* 2: 466 (1864) [Oct. 1864].

Sondera neesii (Lehm.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Habitat in solo turfoso ad portum; Princess Royal Harbour, (Herb. Preiss, no. 1978). [near Albany, Plantagenet district, W. A., *L. Preiss no.* 1978.]" (*iso*: S).

Drosera neesii subsp. *borealis* N.G.Marchant. *Flora of Australia* 8: 384 (1982) [9 Dec. 1982].

Type: WESTERN AUSTRALIA. "11.4 miles (18 km) N of Northampton, W. A., *N.G. Marchant* 64/166. Holo: PERTH" (*holo*: PERTH).

103: *Drosera nitidula* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 285 (1848).

Drosera nitidula Planch. subsp. *nitidula* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 325 (1992)

Type: WESTERN AUSTRALIA. "in colonia fluminis Cygnorum; Drummond in herb. Hook" [Swan River Colony, southwest Western Australia, *J. Drummond s.n.*] (*iso*: K; MPU).

104: *Drosera nivea* Lowrie & Carlquist. *Phytologia* 73 (2): 104 (1992).

Drosera citrina var. *nivea* Schlauer. *Carnivorous Plant Newsletter* 25 (3): 72 (1996).

Type: WESTERN AUSTRALIA. "Western Australia, beside the Midlands Road, 37.3 km southeast of Carnamah, *ca.* 10 km SE of Coorow township, 22 Sept. 1990, *A.Lowrie* 278 (PERTH; iso: RSA)." (*holo*: PERTH; *iso*: RSA).

105: *Drosera occidentalis* Morrison. *Journal of Botany, British and Foreign* 50: 166 (1912).

Type: WESTERN AUSTRALIA. "Beenup, between Canning and Murray Rivers, November", no day or year date, *A. Morrison s.n.* (*iso*: PERTH).

106: *Drosera omissa* Diels. *Das Pflanzenreich* 26: 73 (1906).

Drosera emissa orth. var. F.L.Erickson. *Plants of Prey in Australia*: 22 (1968).

Type: WESTERN AUSTRALIA. "Sudwest-Australien: o.n.O. (Drummond *s.n.* Original der Art!).", [no date], *James Drummond s.n.* [Kew negative No. 15707] (*iso*: B†).

Drosera ericksoniae Marchant & Lowrie. *Kew Bulletin* 47 (2): 323 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, Great Southern Highway, 7·5 km S of Pingelly, in deep white sand around the margins of winter wet depressions, *A. Lowrie* 87/073, 9/11/87 [9 November 1987] (holotypus PERTH)." (*holo*: PERTH).

107: *Drosera orbiculata* N.G.Marchant & Lowrie. *Kew Bulletin* vol. 47 (2): 319 (1992).

Sondera orbiculata (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Western Australia, Bindoon-Moora Highway, 1.3 km N of Gillingarra, in sandy clay soils in washes and winter-wet depressions, *Allen Lowrie* 10/6/86 (holotypus PERTH)" (*holo*: PERTH).

108: *Drosera ordensis* Lowrie. *Nuytsia* 9 (3): 365 (1994).

Type: WESTERN AUSTRALIA. "Weaber Plains Road, 7.6 km north from Hidden Valley Caravan Park, Kununurra, Western Australia, *A. Lowrie* 4, 1 April 1988" (*holo*: PERTH 03391175; *iso*: BRI, DNA, CANB, MEL, NSW).

109: *Drosera oreopodion* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 326 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, Wungong, near railway crossing on Eleventh Road, *ca.* 0.5 km W of southwestern Highway, in clayey sand mixed with laterite pebbles on low heathland, *A.Lowrie* 87/032, 9 October 1987 (holotypus PERTH)" (*holo*: PERTH).

110: *Drosera paleacea* DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 318 (1824) [mid Jan 1824].

Type: WESTERN AUSTRALIA. "in Novâ-Hollandiâ ad portum regis Georgii. (*v.s.* in h. Mus. Par.)" *lectotype*: "King George Sound auf sandigen Heiden, blühend im Dezember (R. Brown…)" *fide* Diels 1906: 67.(*isolecto*: G, K, MEL).

Drosera parvula Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 287 (1848).

Type: WESTERN AUSTRALIA. "cum praecedente; Drummond in herb. Hook. [in colonia fluminis Cygnorum] (*iso*: K).

111: *Drosera pallida* Lindl. *A Sketch of the Vegetation of the Swan River Colony*: xx. (1839).

Sondera pallida (Lindl.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. (none cited). "im Gebiet des Swan River (Mangles ...)" [Swan River, W.A., *J. Mangles s.n.*] (*lecto*: CGE) lectotype *fide* Diels, *Das Pflanzenreich* 26: 116 1906.

112: *Drosera paradoxa* Lowrie. *Nuytsia* 11 (3): 347 (1997).

Type: WESTERN AUSTRALIA. "Wren Creek, on road to Pantijan from Peter Lacy's camp on a tributary of Bachsten Creek, Western Australia, 160° 01' 32" S, 125° 14' 55.7"E, 1 August 1996, *A. Lowrie* 1514" (*holo*: PERTH 04680502; *iso*: MEL).

113: *Drosera patens* Lowrie & Conran. *Taxon* 56 (2): 542–544 (2007) [15 Jun 2007].

D. nitidula subsp. *omissa sensu* Lowrie. *Carn. Pl. Aust.* 2: 98. 1989. *nom. illeg.* non Diels (1906).

Drosera nitidula var. *?* Schlauer. *Carnivorous Plants Newsletter* vol. 25, p. 73 & 82, Sept. (1996).

Type: WESTERN AUSTRALIA. "Western Australia: north west shores of Lake Gnangarra, 31° 46' 57" S, 115° 52' 21" E, 17 January 1998, *Allen Lowrie* 2033 (holotype: PERTH; isotype MEL)" (*holo*: PERTH; *iso*: MEL).

114: *Drosera pedicellaris* Lowrie. *Nuytsia* 15 (1): 59 (2002) [6 Dec 2002].

Type: WESTERN AUSTRALIA. "Dookanooka Rd, *ca.* 15 km southwest of Three Springs, 29° 38' 39" S 115° 38' 36" E, *A. Lowrie* 1980, 14 November 1997" (*holo*: PERTH; *iso*: MEL).

115: *Drosera peltata* Thunb. *Dissertatio Botanica de Drosera*: 7 (1797).

Drosera peltata (Thunb.) subsp. *peltata* B.J.Conn. *Journal of the Adelaide Botanic Gardens* 3: 95 (1981).

Type: NEW SOUTH WALES. " '*Ex nova Hollandia per* [J.] white'; Herb. Thunberg 7720, (UPS—right specimen)." (*lecto*: UPS; selected by B.J.Conn (1981))

116: *Drosera petiolaris* R.Br. ex DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 318 (mid Jan

1824).

Drosera petiolaris Sieber ex C. Presl. *Abh. Königl. Böhm. Ges. Wiss.* ser. 5, 3: 444. 1845 [Jul-Dec 1845]; *Bot. Bemerk.* (C. Presl): 14. [Jan- Apr 1846].

Type: Queensland: "Nova-Hollandia prope Endeavour-river (*v.s.* in h. Banks)." (*holo*: BM. BM000797271).

117: *Drosera* × *pingellyensis* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1274 (2013).

Type: WESTERN AUSTRALIA. "on Great Southern Highway, *ca.* 10 km south of Pingelly, 32° 36' 24" S, 117° 05' 52" E, 10 December 1991, *Allen Lowrie* 561" (*holo*: PERTH; *iso*: MEL).

118: *Drosera planchonii* Hook.f. ex Planch. *Annales des Sciences Naturelles* ser. 3, 9 (1848).

Drosera planchonii Hook.f. *Flora of Tasmania* i. 29.

Drosera macrantha subsp. *planchonii* (Hook.f. ex Planch.) N.G.Marchant. *Flora of Australia* 8: 383, 38 (1982).

Drosera menziesii var. *albiflora* Benth. based on *Drosera planchonii* Hook.f. ex Planch. (Bentham 1864: 468). *Flora Australiensis* 2 (1864).

Type: TASMANIA. "in insulae Van Diemen ora orientali loco dicto Swan Port (Gunn, no. 449, in herb. Hook.)." (*holo*: HO, K); "*nec non in Novae Hollandiae ora australi ad* Port Phillip, [Vic.] (Gunn no. 5, ibid.)." (*syn*: *n.v.*): "Encounter Bay, [S.A.] (Whittaker, [*s.n.*] ibid.)." (*syn*: *n.v.*).

119: *Drosera platypoda* Turcz. *Bulletin de la Societe Imperiale des Naturalistes de Moscou* 27 (4): 343 (1855).

Sondera platypoda (Turcz.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Nova Hollandia [Australia], Drum. [*J. Drummond*] V [5th coll.] n. 281." (*iso*: K, MEL).

Drosera flabellata Benth. *Flora Australiensis* 2: 464 (1864) [5 Oct 1864].

Type: WESTERN AUSTRALIA. "W. Australia towards Cape Riche, *Drummond,* 5th coll. n. 281." (*iso*: FL, K).

120: *Drosera platystigma* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 37 (1844) [Apr 1844].

Type: WESTERN AUSTRALIA. "Habitat in solo glareoso inter frutices densos (Plantaginet) prope "Seven Miles bridge" (Herb. Preiss. no. 1994)." (*iso*: MEL, S).

121: *Drosera porrecta* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 41 (1844) [Apr 1844].

Drosera stolonifera subsp. *porrecta* (Lehm.) N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 320 (1992).

Sondera porrecta (Lehm.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 44 (2000).

Type: WESTERN AUSTRALIA. "Crescit in Iocis arenosis montis Eiza mountain [Mount Eliza] (Perth) [Western Australia]. (Herb. *Preiss.* no. 1985)." (*iso*: K, MEL 96886, 96891 & 96893, P).

122: *Drosera praefolia* Tepper. *Botanisches Centralblatt* 50 (12–13): 357 (1892).

Drosera bulbosa var. *praefolia* (Tepper) Raym.-Hamet. *Bulletin de la Societe Botanique de France* 54: 70 (1907).

Drosera whittakeri var. *praefolia* (Tepper) J.M.Black. *Flora of South Australia* 2: 258 (1924).

Drosera whittakeri subsp. *praefolia* (Tepper) Lowrie. *Bulletin of the Australian Carnivorous Plant Society* 8: 47 (1989).

Drosera aphylla Tepper ex Lowrie & Conran. *nom. inval., pro. syn. Telopea* 12 (2): 155 (2008).

Type: SOUTH AUSTRALIA. "Im August 1881 langte ich in Clarendon an, um das Dorf für einige Zeit zu meinem Wohnsitze zu machen. Vorher war ich für einige Jahre im nordöstlichen Theile von Yorke's peninsula ... "

Lectotype: (chosen by R.Bates in *Journal of the Adelaide Botanic Gardens* 14 (1): 99 (1991): Clarendon, grassy hillsides in very dry soils, 7 April 1882, *Tepper* 618 (*lecto*: MEL); Clarendon, May 1882, Tepper *s.n.* (*syn*: AD).

123: *Drosera prolifera* C.T.White. *The Victorian Naturalist* 57 (5): 94. t. 95 (1940).

Type: QUEENSLAND. "Cook District: Thornton Peak (in sheltered places near the summit), alt. 4,000 ft. *L.J. Brass*, No. 2272 (flowers and immature fruits), 14/3/1932 [14 March 1932]" (*holo*: BRI).

124: *Drosera prophylla* (Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1276 (2013).

Drosera marchantii subsp. *prophylla* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 319 (1992).

Type: WESTERN AUSTRALIA. "Brand Hwy,

17·2 km N of Cataby, in laterite-silica sand soils, only on hill tops in open ground on heathland, *A. Lowrie* 83/002, 23/6/83 [23 June 1983] (holotypus PERTH)." (*holo*: PERTH).

125: *Drosera prostrata* (N.G.Marchant & Lowrie) Lowrie. *Nuytsia* 15 (3): 374 (2005) [16 Dec 2005].

Comment: ***Drosera prostrata*** (N.G.Marchant & Lowrie) Lowrie [*nom. inval.*]. *Nuytsia* 15 (3): 374–375, Figs 6, 12, 14 (2005). This name was considered invalid because my reference to the basionym was indirect, as the pagination of the whole publication is given rather than an exact page reference (see ICBN Art. 33.4 Note. 1 (2006)). I was advised that because the first page of this species treatment is given in this citation, it is considered valid. So there are no further inconsistencies, the basionym exact page '374' reference has been corrected in *Nuytsia* 21 (3): 152 (2011).

Drosera stolonifera subsp. *prostrata* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 320 (1992).

Type: WESTERN AUSTRALIA. "Kalbarri, on the road to The Loop, in yellow and white sandy soils between low shrubs on heathland, Western Australia, 14 June 1984, *A. Lowrie* 84/073." (*holo*: PERTH).

126: *Drosera prostratoscaposa* Lowrie & Carlquist. *Phytologia* 69 (3): 160 (1990).

Type: WESTERN AUSTRALIA. "Western Australia: in fine grained black sand on the flats, as well as in a soil mixture of sand, laterite, and a small amount of quartzite rock floaters on the lower scree slopes a short distance away from a small tributary of the Hamersley River, where the tributary crosses Hamersley Drive, *ca.* 40 km southeast of South Coast Highway, Fitzgerald National Park, Western Australia, April 23, 1990, *A.Lowrie* 96 (PERTH; iso: CANB, K, RSA)" (*holo*: PERTH, *iso*: CANB, K, RSA).

127: *Drosera pulchella* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 38 (1844).

Type: WESTERN AUSTRALIA. "Crescit in distrctu "Plantagenet [Albany]" ad "Stirlingsterasse [Stirling Terrace] "locis turfosis arenosis. (*Herb. Preiss.* no. 1992" (*holo*: S; *iso*: MEL).

128: *Drosera purpurascens* Schlotth. *Bonplandia* 4: 111 (1856).

Type: WESTERN AUSTRALIA. "Schedula Preissiana Nr. 1977. [*L. Preiss* 1977] In solo turfosarenoso prope montem 'Wuljenap (Plantagenet)' L. Preiss legit." [Wolyamup Hill, 33°32'S, 117°54'E, *ca.* 35 km NE of Katanning, Western Australia *non* Mt Willyung *sensu* Marchant (1982) or Wuljenup *sensu* Lehmann (1844) and Bentham (1864)]" (*iso*: P).

Drosera stolonifera subsp. *compacta* N.G.Marchant. *Fl. Australia* 8: 384, 43 (1982).

Type: WESTERN AUSTRALIA. "2 miles [3.2 km] SW of Ongerup, Western Australia, 28 September 1963, *K.R. Newbey* 977." (*holo*: PERTH).

129: *Drosera pycnoblasta* Diels. *Botanische Jahrbucher fur Systematik* 35 (2): 207 (1904) [6 Dec 1904].

Type: WESTERN AUSTRALIA. "in distr. Avon pt. Tammin in arenosis aridis fruticutosis flor. m. Octob[er]. (D. [Diels] 5079)." (*iso*: B).

130: *Drosera pygmaea* DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 1: 317 (1824) [mid Jan 1824].

Type: NEW SOUTH WALES. "in insula ad introitum Jervis's bay, Caley." (*holo*: BM. BM001015759).

Lectotype: "Bowan Island am Eingang von Jervis' Bay (Caley!, F. Bauer del. 530 ...)" *fide* Diels 1906 (*lecto*: *n.v.*).

131: *Drosera radicans* N.G.Marchant. *Flora of Australia* 8: 384 (1982) [9 Dec. 1982].

Type: WESTERN AUSTRALIA. "Howatharra Hill Reserve, 21 miles (*c.*33 km) N of Geraldton, W.A., 10 Aug. 1974, *D. & N.McFarland* 1065, (holo: PERTH)", (*holo*: PERTH).

132: *Drosera ramellosa* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 40 (1844) [Apr 1844].

Sondera ramellosa (Lehm.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Crescit in locus arenosis humidis prope lacum insulae Rotenest. [Rottnest Island], (Herb. Preiss. No 1990 [*Preiss* 1990])." (*iso*: FI, MEL, S).

Drosera penduliflora Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 301 (1848).

Type: WESTERN AUSTRALIA. "in colonia Swan River [Swan River Colony southwest Western Australia], Drummond [*J. Drummond s.n.*] in herb. Hook." (*iso*: K).

133: *Drosera rechingeri* Strid. *Plant Systematics and Evolution* 155: 343 (1987).

Type: WESTERN AUSTRALIA. "Kalbarri National Park, near a place called Z Bend by Murchison River, lat. 27° 39' S, long. 114° 28' E, [in] Heath [-land] 1–2 m tall, chiefly on yellow sand, 9 October 1982, STRID 20805; C. Isotypi in B, G, K, MO,

PERTH." (*holo*: C; *iso*: B, G, K, MO, PERTH).
Drosera coolamon N.G.Marchant *nom. nud.,* [presented without Latin description as "publication in preparation"]. *Carnivorous Plants of Australia* 2: 38 (1989).

134: *Drosera roseana* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 327 (1992).

Drosera paleacea subsp. *roseana* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 73 (1996) [Sept. 1996].

Type: WESTERN AUSTRALIA. "Western Australia, Millbrook Road, *ca.* 5 km E of Albany Highway, in peaty sand on the margins of swamps, *A.Lowrie* 87/025, 7 October 1987 (holotypus PERTH)." (*holo*: PERTH).

135: *Drosera rosulata* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 36 (1844) [Apr 1844].

Drosera rosulata Behr. *Linnaea* 20: 628 (1847).

Sondera rosulata (Lehm.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Crescit locis arenosa-turfosis ad fluvium Cygnorum prope oppidulum Perth. (Herb. Preiss. No. 1983)." [southwest Western Australia: [growing locality sandy-peat near Swan River near the town of Perth] (*holo*: MEL; *iso*: S.).

136: *Drosera rupicola* (N.G.Marchant) Lowrie. *Nuytsia* 15 (3): 382 (2005) [16 Dec 2005].

Drosera stolonifera subsp. *rupicola* N.G.Marchant. *Flora of Australia* 8: 384 (1982).

Type: WESTERN AUSTRALIA. "Murray Rock, SE of Hyden, W.A. 22 September 1971, *N.G.Marchant* 71/680; holo: PERTH." (*holo*: PERTH).

137: *Drosera salina* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 320 (1992).

Sondera salina (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Western Australia SW bay of salt lake, 72 km E of Lake King, thence 5 km SE, on the margins of salt lakes in salt-free sand almost at the edge of the water, *A.Lowrie* 84/062, 14/9/84 (holotypus PERTH)" (*holo*: PERTH).

138: *Drosera sargentii* Lowrie & N.G.Marchant. *Nuytsia* 8 (3): 330 (1992).
Drosera parvula subsp. *sargentii* (Lowrie & N.G.Marchant) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 72 (1996).

Type: WESTERN AUSTRALIA. "At the junction of Stockyard Road and Merivale Road, in the S. E. corner, *ca.* 20 km E of Esperance, Western Australia, *Allen Lowrie* 22/11/89, [22 November 1989] (holo: PERTH; iso: MEL)" (*holo*: PERTH, *iso*: MEL).

139: *Drosera schizandra* Diels. *Das Pflanzenreich* 26: 80 (1906).

Type: QUEENSLAND. "Nordost-Australien: Nord-Queensland am Mount Bartle Frere (St. Johnston [*Stephen Johnson s.n.*] 1891 – Original der Art!))." (*holo*: B). [Barcode for type sheet is B 10 0294461, Image ID number: 284834. The type sheet label is the printed label of "Phytologic Museum of Melbourne (now herbarium MEL), Baron Ferd. von Mueller, PH. & M.D": specimen data written on label in the hand of Mueller: '*Drosera adelae* FvM var. *latior* Mt Bartle Frere (Queensland), 1891, Stephen Johnson.' (not published)]

140: *Drosera schmutzii* Lowrie & Conran. *Telopea* 12 (2): 157 (2008)

Type: SOUTH AUSTRALIA. "South Australia: corner of South Coast Road and Elsegood Road, *ca.* 20 km south of Kingscote, Kangaroo Island (35 46'11"S, 137 33'34"E), 6 Sep 2003, *A.Lowrie* 2816 & *D.E.Murfet* (holo: AD; iso: PERTH, MEL)" (*holo*: AD, *iso*: PERTH, MEL).

141: *Drosera scorpioides* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 288 (1848).

Type: WESTERN AUSTRALIA. "in colonia fluminis Cygnorum; Drummond in herb. Hook [south western W.A., *Drummond* 4: 125]" (*iso*: K).

142: *Drosera serpens* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 204 (1848).

Type: QUEENSLAND. "Nec non in ora orientali ad ostia fluminis Endeavour; *Banks* et *Soland.* in herb. Mus. Brit."(*lecto*: BM, designated by Barrett & Lowrie (2013)).

143: *Drosera sewelliae* Diels. *Botanische Jahrbucher fur Systematik* 35 (2): 206 (1904) [6 Dec 1904].

Type: WESTERN AUSTRALIA. "in distr. Avon, prob. ab urbe York orientem versus flor. (Miss SEWELL ex herb. Melbourne comm. in hb. Berol.). Eandem speciem alter nostrum (E. PRITZEL) pr. Tammin vidisse meminit, sed specimina non attulerat."

Lectotype: "…(Miss Sewell … in Herb. Berolin)."

fide Diels *Das Pflanzenreich* 26: 73 (1906) (*lecto*: B).

144: *Drosera* × *sidjamesii* Lowrie & Conran. *Australian Systematic Botany* 20 (1): 50 (2007) [Feb 2007].

Type: WESTERN AUSTRALIA. "Western Australia: northern shores of Lake Gnangarra on sand/peat boundary along western shore in seasonally inundated Restionaceae swampland, 31° 46' 53"S, 115° 52' 03"E, 31 Mar. 1992, *Allen Lowrie* 587. holo: PERTH; iso: MEL." (*holo*: PERTH; *iso*: MEL).

145: *Drosera silvicola* Lowrie & Carlquist. *Phytologia* 73 (2): 105 (1992).

Drosera barbigera subsp. *silvicola* (Lowrie & Carlquist) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 72 (1996).

Type: WESTERN AUSTRALIA. "Western Australia: in laterite gravel soils in open jarrah forest, 7 km S of North Bannister on the Albany Highway, 11 November 1991, *Allen Lowrie* 513 (PERTH; iso: RSA)" (*holo*: PERTH; *iso*: RSA).

146: *Drosera spatulata* Labill. *Novae Hollandiae Plantarum Specimen* 1 (9–10): 79, t. 106 (1805).

Type: TASMANIA. "in capite Van-Diemen." (*holo*: *n.v.*). *Lectotype*: "Gegend von Southport an sumpfigen Stellen (Labillardière ...)" *fide* Diels *Das Pflanzenreich* 25: 83 (1906).

Drosera spathulata orth. var. Schult. *Systema Vegetabilium* Edn. 16, 6: 762 (1820).

Drosera lovellae F.M.Bailey. *Botany Bulletin. Department of Agriculture, Queensland* 7: 61 (1893).

Type: QUEENSLAND. "Fraser Island, Hon. Miss S. Lovell ..." (*holo*: BRI).

Drosera spatulata var. *gympiensis* R.P.Gibson & I.Snyder. *Carnivorous Plant Newsletter* 34 (2): 56 (2005).

Type: QUEENSLAND. "Opposite the south end of Fraser Island, Queensland, in swampy soil; wallam community; sea level, 18 January 1928, Anon. 4 [AQ183256]" (*holo*: BRI).

147: *Drosera spilos* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 327 (1992).

Type: WESTERN AUSTRALIA. "Western Australia, Bindoon-Moora Highway, 0.6 km S of Gillingarra, in loam soils covered with laterite pebbles, *A.Lowrie* 85/098, 20 October 1985 (holotypus PERTH)." (*holo*: PERTH).

148: *Drosera squamosa* Benth. *Flora Australiensis* 2: 463 (1864) [5 Oct 1864].

Drosera erythrorhiza subsp. *squamosa* (Benth.) N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 318 (1992).

Sondera squamosa (Benth.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000)

Type: WESTERN AUSTRALIA. "W. Australia. Between Perth and King George's Sound, Preiss (Herb. Sonder), Harvey." [*L.Preiss s.n.*] (*syn*: K, MEL).

Lectotype: "W. Australia. Between Perth and King George's Sound, Preiss (Herb. Sonder) Harvey. (*syn*: K). *fide* Diels. *Das Pflanzenr* 26: 123 (1906) [July 1906].

SynType: "Towards the Great Bight, W.A., *G. Maxwell s.n.*"(*syn*: K).

149: *Drosera stelliflora* Lowrie & Carlquist. *Phytologia* 73 (2): 107 (1992).

Drosera paleacea subsp. *stelliflora* (Lowrie & Carlquist) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 72 (1996).

Type: WESTERN AUSTRALIA. "In laterite soils sometimes with a little silica sand, along creek line at the motor-cross track, east end of North Jindong Road, south of Busselton, 24 November 1990, *Allen Lowrie* 204 (PERTH); iso: RSA" (*holo*: PERTH, *iso*: RSA).

150: *Drosera stolonifera* Endl. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 5 (1837) [Apr 1837].

Drosera stolonifera (Endl.) var. *stolonifera* Diels. *Das Pflanzenreich* 26: 126 (1906);

Drosera stolonifera (Endl.) subsp. *stolonifera* N.G.Marchant. *Flora of Australia* 8: 384 (1982).

Sondera stolonifera (Endl.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Swan-River. (Hügel)." [*Hügel* 3–6 or 16–17 December 1833] (*iso*: W).

151: *Drosera stricticaulis* (Diels) O.H.Sargent. *Journal of Botany, British and Foreign* 51: 40 (1913).

Drosera macrantha var. *stricticaulis* Diels. *Das Pflanzenreich* 26: 119 (1906).

Drosera stricticaulis subsp. *eremaea* (N.G.Marchant & Lowrie) Schlauer. *Carnivorous Plant Newsletter* 25 (3): 73 (1996).

Type: WESTERN AUSTRALIA. "Südwest-Australien: o.n.O. (Drummond n. 37 – Original der Vari-

etät! ..." (*iso*: MEL).

152: *Drosera subhirtella* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 292 (1848).

Drosera macrantha var. *minor* Benth. *Flora Australiensis* 2: 468 (1864).

Drosera subhirtella (Planch.) var. *subhirtella* Diels. *Das Pflanzenreich* 26: 119 (1906).

Drosera subhirtella (Planch.) subsp. *subhirtella* N.G.Marchant. *Flora of Australia* 8: 385 (1982).

Sondera subhirtella (Planch.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "cum praecedente; Drummond in herb. Hook." *Lectotype*: Swan River [Colony], southwest Western Australia, *J. Drummond s.n.,* in herb. Hook. (designated *fide* Lowrie 1999). (*lecto*: K).

Drosera menziesii var. *flavescens* Benth. *Flora Australiensis* 2: 468 (1864).

Type: *p.p.* as to Oldfield collections: Hill River, Western Australia, *A. Oldfield s.n.* (*syn*: MEL 96906); Vasse River, Western Australia, *A. Oldfield s.n.* (*syn*: MEL 96904).

Typification note: Bentham's type citation under *Drosera menziesii* var. *flavescens* consists of three collections. The Drummond collection is also the holotype of *D. intricata*. The Hill River, and Vasse River collections of Oldfield are (Hill River) *D. subhirtella* and (Vasse River) *D. intricata.*

153: *Drosera subtilis* N.G.Marchant. *Flora of Australia* 8: 385 (1982).

Type: WESTERN AUSTRALIA. "Mitchell Plateau Mining Camp, W.A., 5 Mar. 1980, *C.R. Dunlop* 5412; holo: DNA; iso: CANB, MEL, PERTH" (*holo*: DNA; *iso*: CANB, MEL, PERTH).

154: *Drosera sulphurea* Lehm. *Novarum et minus cognitarum stirpium pugillus octavus*: 43 (1844) [Apr 1844].

Drosera neesii var. *sulphurea* (Lehm.) Benth. *Flora Australiensis* 2: 466 (1864).

Drosera neesii Lehm. subsp. *neesii* N.G.Marchant. *Flora of Australia* 8: 29 1982. *Sondera sulphurea* (Lehm.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Crescit in districtu Plantagenet in solo turfoso et inter frutices densos planitiei prope oppidulum Albany, (Herb. Preiss, no. 1981.) [near Albany, Plantagenet district, W. A., *L. Preiss no.* 1981.]" (*iso*: MEL, S).

155: *Drosera thysanosepala* Diels. *Das Pflanzenreich* 26: 121 (1906) [31 July 1906].

Drosera menziesii subsp. *thysanosepala* (Diels.) N.G.Marchant. *Flora of Australia* 8: 383 (1982).

Sondera thysanosepala (Diels) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Südwest-Australien: 'zwischen Moore River und Murchison River' (Drummond coll. VI. n. 107 – Original der Art!)." [between Moore and Murchison Rivers, W.A., *J. Drummond* Collection VI. n. 107.] (*lecto*: *fide* Diels (1906); *iso*: *fide* N.G.Marchant (1982), B)

156: *Drosera trichocaulis* (Diels) (N.G.Marchant & Lowrie) Lowrie. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1276 (2013).

Drosera paleacea var. *trichocaulis* Diels. *Das Pflanzenreich* 26: 67 (1906).

Drosera paleacea subsp. *trichocaulis* (Diels) N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 327 (1992).

Type: WESTERN AUSTRALIA. "Südwest-Australien: Von Doubtful Island Bay Landeinwärts auf trockenen sandigen Heiden, Blühend Anfang Oktober 1901 (Diels n. 4779-Original der Varietät!)."

157: *Drosera tubaestylis* N.G.Marchant & Lowrie. *Kew Bulletin* 47 (2): 321 (1992).

Sondera tubaestylis (N.G.Marchant & Lowrie) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "Western Australia, 2.5 km E of Murray Bend, Ravenswood, in sandy clay soils under and between low shrubs on the margins of swamps, *A. Lowrie* 84/059, 26 May 1984 (holotypus PERTH)." (*holo*: PERTH).

158: *Drosera verrucata* Lowrie & Conran. *Carnivorous Plants of Australia Magnum Opus*, Appendix: 1272 (2013).

Type: WESTERN AUSTRALIA. "Parker Brook Rd, Albany, 34° 56' 37" S 117° 49' 41" E, 10 October 2000, *A. Lowrie* 2572." (*holo*: PERTH, *iso*: MEL).

159: *Drosera walyunga* N.G.Marchant & Lowrie. *Kew Bull.* 47 (2): 328 (1992).

Type: WESTERN AUSTRALIA. "Western Australia: O'Brien Road, *ca.* 12 km N of Toodyay Road, in sandy white clay with a thin overlay of laterite gravel in open heathland, *A. Lowrie* 84/081, 8 November

1984 (holotypus PERTH)." (*holo*: PERTH).

160: *Drosera whittakeri* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 302 (1848).

Sondera whittakeri (Planch.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: SOUTH AUSTRALIA. "ad Encounter-bay; Whittaker ibid" [*fide* A. Lowrie, *v.v.* Parsons Beach, Encounter Bay, South Australia, 35° 37' 59" S, 138° 28' 45" E, 8 Sep. 2003, *Allen Lowrie* 2834.], no date, *Whittaker s.n.*, (*holo*: *n.v.*).

161: *Drosera yilgarnensis* R.P.Gibson & B.J.Conn. *Australian Systematic Botany* 25: 75 (2012).

Type: WESTERN AUSTRALIA. "Western Australia: Roe: Mt Madden, *P. Mann* 18/2003 & *R.Gibson*, 23 Oct. 2003 (holo: PERTH; iso: NSW)." (*holo*: PERTH; *iso*: NSW.).

162: *Drosera zigzagia* Lowrie. *Nuytsia* 13 (1): 85 (1999).

Type: WESTERN AUSTRALIA. "Lake Seabrook, *ca.* 40 km north-east of Southern Cross, Western Australia, [30° 56' 30" S, 119° 35' 30" E], 21 August 1979, *K Newby* 5750 (holo: PERTH 0066960; iso: MEL)." (*holo*: PERTH 0066960; *iso*: MEL).

163: *Drosera zonaria* Planch. *Annales des Sciences Naturelles; Botanique. Series 2–10* ser. 3, 9: 303 (1848) [May 1848].

Sondera zonaria (Planch.) Chrtek & Slavikova. *Novitates Botanicae ex Universitate Carolina* 13: 45 (2000).

Type: WESTERN AUSTRALIA. "in colonia Swan River, Drummond in Herb. Hook. (Folia tantum. [leaves only])" *J. Drummond s.n.* (*iso*:K).

NEPENTHEACEAE

1: *Nepenthes mirabilis* (Lour.) Druce. *The Botanical Exchange Club and Society of the British Isles Report for 1916, Suppl.* 2: 637 (1917).

Phyllamphora mirabilis Lour. *Flora Cochinchinensis* Edn. 1, 2: 606 (1790).

Type: VIETNAM. "Habitat loca humida & agrestia Cochinchinae" (*holo*: *n.v.*).

Nepenthes kennedyana F. Muell. *Fragmenta Phytographiae Australiae* 5 (37): 154 (1866).

Nepenthes kennedyi orth. var. F. Muell. ex Benth. *Flora Australiensis* 6: 40 (1873).

Type: "Ad oppidulum Somerset juxta promontorium Cape York. *J. Jardine*." (*iso*: MEL).

Nepenthes bernaysii F.M. Bailey. *Proceedings of the Linnean Society of New South Wales* 5: 186 (1880).

Type: "Cape York, whence it was sent by a correspondent some few years ago to the Queensland Acclimatization Society."

Nepenthes jardinei F.M. Bailey. *Queensland Agricultural Journal* 1 (3): 230, pl. (1897).

Type: "Somerset, Cape York Peninsula, *Frank L. Jardine*." (*holo*: BRI).

Nepenthes moorei F.M. Bailey. *Queensland Agricultural Journal* 3 (5): 355, pl. LIX (1898).

Type: "Cape York Peninsula, *F.L. Jardine*." (*holo*: BRI).

Nepenthes albolineata F.M. Bailey (as 'albo-lineata'). *Queensland Agricultural Journal* 3 (5): 354, 355, pl. LVIII (1898).

Type: "Cape York Peninsula, *F.L. Jardine*." (*holo*: BRI);

Nepenthes aliceae F.M. Bailey. *Queensland Agricultural Journal* 3 (5): 356, pl. LX (1898).

Nepenthes alicae orth. var. F.M. Bailey. *Queensland Agricultural Journal* 3 (5): 356 (1898).

Type: "Cape York Peninsula, *F.L. Jardine*." (*holo*: BRI).

Nepenthes cholmondeleyi F.M. Bailey. *Queensland Agricultural Journal* 7 (5): 441 (1900).

Type: "Cape York Peninsula, 5 miles (8 km) south of the Jardine River, Cholmondeley Jardine." (*holo*: BRI).

Nepenthes pascoensis F.M. Bailey. *Queensland Agricultural Journal* 16 (2): 190 (1905).

Type: "Head of Pascoe River. *R.W. Garraway*, ..." (*holo*: BRI).

Nepenthes armbrustiae F.M. Bailey. *Queensland Agricultural Journal* 16 (2): 191 (1905),

Nepenthes armbrustae orth. var. F.M. Bailey.

Type: "Coen, Miss *F. Armbrust*."; (*holo*: BRI).

Nepenthes garrawayae F.M. Bailey. *Queensland Agricultural Journal* 16 (2): 191 (1905).

Type: "Between York Downs and Weipa, *R.W. Garraway*." (*iso*: BRI).

2: *Nepenthes rowaniae* F.M.Bailey. *Queensland Agricultural Journal* 1 (3): 231, pl. (1897).

Nepenthes rowanae orth. var. F.M.Bailey. *Queensland*

Agricultural Journal 1 (3): 231 (1897).

Type: QUEENSLAND. "Somerset, Cape York Peninsula, *Frank L. Jardine*" (*holo*: BRI).

3: *Nepenthes tenax* C.Clarke & R.Kruger. *Austrobaileya* 7 (2): 319 (2006).

Type: QUEENSLAND. "Queensland. Cook District: Head of Cowal Creek near Cape York, *F.W. Whitehouse s.n.* (holo: BRI [AQ46887])." (*holo*: BRI).

LENTIBULARIACEAE

Utricularia* subgenus *Polypompholyx*, section *Polypompholyx

Each species section is given in brackets alongside the species name.

1: *Utricularia multifida* R.Br. (section *Polypompholyx*) *Prodromus Florae Novae Hollandiae*: 432 (1810).

Polypompholyx multifida (R.Br.) F.Muell. *Fragmenta Phytographiae Australiae* 6 (45): 162 (1868).

Type: WESTERN AUSTRALIA. "(M.) *v.v.* [Western Australia, King George Sound, Albany], *R. Brown s.n.*" (*holo*: BM).

Utricularia latiloba Benth. *Enumeratio plantarum quas in Novae Hollandiae ora austro-occidentali ad fluvium Cygnorum et in Sinu Regis Georgii collegit Carous liber baro de Hugel*: 82 (1837).

Type: WESTERN AUSTRALIA. "King George Sound, [Albany], *Hügel s.n.*" (*holo*: *n.v.*).

Utricularia preissii A.DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 8: 666 (1844).

Polypompholyx endlicheri Lehm. In *Botanische Zeitung* 2: 109 (9 Feb. 1844).

Tetralobus preissii A.DC. [A.DC.] *Prodromus Systematis Naturalis Regni Vegetabilis* 8: 667 (March 1844).

Type: WESTERN AUSTRALIA. "Western Australia, Swan River, *Preiss* 1921" (*holo*: G-DC; *iso*: MEL).

Polypompholyx latiloba (Benth.) Lehm. Plantae Preissianae 1 (3): 340 (1845).

Type: WESTERN AUSTRALIA. "Western Australia, Preiss 1919" (holo: G-DC);

Utricularia similis Lehm. Novarum et Minus Cognitarum Stirpium Pugillus 8: 46 (1844).

Type: WESTERN AUSTRALIA. "Crescit in locis arenosis aquaticis prope oppidulum Perth (Herb. Preiss. no 1919" (holo: S; iso: BR, MEL, W).

2: *Utricularia tenella* R.Br. (section *Polypompholyx*) *Prodromus Florae Novae Hollandiae*: 432 (1810).

Vesiculina tenella (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Polypompholyx tenella (R.Br.) Lehm. *Botanische Zeitung* 2: 109 (1844).

Type: WESTERN AUSTRALIA. "(M.) *v.v.* [King George Sound, R. Brown *s.n.*]" (*holo*: BM).

Tetralobus pusillus A.DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 8: 667 (1844).

Type: WESTERN AUSTRALIA. "in Nova Hollandia occid. ad flumen Cygnorum (Preiss! n. 1920)" (*holo*: G-DC; *iso*: MEL).

Polypompholyx exigua F.Muell. *Definitions of rare or hitherto undescribed Australian plants*: 17 (1855).

Types: VICTORIA & SOUTH AUSTRALIA. "In mossy, peaty or boggy places at the Grampians, Serra and Victoria ranges *Mueller s.n.* (K & MEL); and in South Australia at Echunga. *Mueller s.n.* (K & MEL)."

3: *Utricularia westonii* P.Taylor. (section *Polypompholyx*) [formerly placed in section *Tridentaria* by Taylor (1989)] *Kew Bulletin* 41 (1): 2 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Cape Le Grand National Park, *P. Taylor* 17008 (*holo*: K; *iso*: CANB, L, M, MEL, PERTH, US)."

LENTIBULARIACEAE

***Utricularia* subgenus *Polypompholyx*, section *Pleiochasia*.**

***Utricularia* subgenus *Utricularia*, sections *Australes*; *Meionula*; *Minutae*; *Nelipus*; *Nigrescentes*; *Oligocista*; *Setiscapella*; & *Utricularia*.**

Each species section is given in brackets alongside the species name.

1: *Utricularia albiflora* R.Br. (section *Pleiochasia*) *Prodromus Florae Novae Hollandiae*: 43 (1810).

Vesiculina albiflora (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: QUEENSLAND. "Banks et Soland. [*Banks & Solander s.n.*] (T.) B. [Point Lookout, Queensland]" (*holo*: BM).

2: *Utricularia antennifera* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 2 (1986).

Type: WESTERN AUSTRALIA. "Western Aus-

tralia, Mitchell Plateau, *C.R. Dunlop* 5320 (holotypus K; isotypi CANB, DNA, MEL, PERTH." (*holo*: K; *iso*: CANB, DNA, MEL, PERTH).

3: *Utricularia arnhemica* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 3 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, *ca.* 65 km from Pine Creek on Oenpelli road, *P. Taylor* 17156 (holotypus K; isotypi CANB, DNA, L, MEL, NSW, NT, PERTH)." (*holo*: K; *iso*: CANB, DNA, L, MEL, NSW, NT, PERTH).

4: *Utricularia aurea* Lour. (section *Utricularia*) *Flora Cochinchinensis* Edn. 1, 1: 26 (1790).

Type: VIETNAM. "Habitat in fluviis lentioris curvus in Cochinchina." (*holo*: no specimen located, *fide* P. Taylor).

Utricularia flexuosa Vahl. *Enumeratio Plantarum* 1: 198 (1804).

Type: "India orientali, König *s.n.* "(*holo*: C; *iso*: W).

5: *Utricularia australis* R.Br. (section *Utricularia*) *Prodromus Florae Novae Hollandiae*: 430 (1810).

Type: NEW SOUTH WALES. "(J.D.) *v.v.* – Australia, New South Wales, between Hawksbury and Paramatta, *R. Brown s.n.*" (*holo*: BM).

6: *Utricularia beaugleholei* Gassin. (section *Pleiochasia*) *Muelleria* 8 (1): 37 (1993).

Type: Victoria: "Victoria: 8 km NNE of Strathmerton near site of Mywee railway station in the Murray Valley, 30 Sep. 1978, *T.B. Muir* 5322 (MEL)." (*holo*: MEL).

7: *Utricularia benthamii* P.Taylor. (section *Pleiochasia*) *Kew Bull.* 41 (1): 3 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, near Lake Muir, *ca.* 300 km SSW of Perth, *P. Taylor* 17029 (holotypus K; isotypi CANB, MEL, PERTH)." (*holo*: K; *iso*: CANB, MEL, PERTH).

8: *Utricularia bifida* L. (section *Oligocista*) *Species Plantarum* 1: 18 (1753).

Nelipus bifida (L) Raf. *Flora Telluriana* 4: 109 (1838).

Type: CHINA. "Habitat in China. [Guangdong, 'on the Danish Island off Canton'] *Osbeck*." (*holo*: LINN; *iso*: C).

Synonymy: *Utricularia wallichiana* Wight. *Icones Plantarum Indiae Orientalis* 4 (4): t. 1572/1 (1850).

Type: (not cited).

Utricularia scandens Benj. *Linnaea* 20: 309 (1847).

Type: "Ind. orient. Madras."

Utricularia odorata Pelleg. *Bulletin du Museum d'Histoire Naturelle. Paris [Series 1]* 26: 182 (1920).

Type: "Cambodge: Kampot (464 *Geoffrey*)."

Utricularia pterocalycina O.Schwarz. *Repertorium Specierum Novarum Regni Vegetabilis* 24: 97 (1927).

Type: "Koolpinyah, [Northern Territory] sandy flat (*Bleeser* no. 392)."

Utricularia involvens Ridl. *Journal of Botany, British and Foreign* 33: 11 (1895).

Type: "Kedah, on Kedah Peak (Gunong Jerai), in streams and wet spots at 3000 ft. altitude."

Remaining synonymy extensive, see Taylor 308-309 (1989) for full citations.

9: *Utricularia biloba* R.Br. (section *Nelipus*) *Prodromus Florae Novae Hollandiae*: 432 (1810).

Nelipus biloba (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: NEW SOUTH WALES. "(J.) *v.v.* [J = R. Brown's code for New South Wales, Sydney, & *v.v.* = I have seen it in the living state] *R. Brown s.n.* [*sine numero* = without a number]" (*holo*: BM).

Utricularia baueri R.Br. *Prodromus Florae Novae Hollandiae*: 431 (1810). *Type*: New South Wales, Sydney, "(J.) *D. Bauer.* [*s.n.*] *v.s.*"

Lectotype: (*lecto*: MEL [chosen by Peter Taylor 1989]; *iso*: W).

Utricularia lawsonii F.E.Lloyd. *The Victorian Naturalist* 53: 110 (1936), (as *lawsoni*).

Type: New South Wales, Sydney: "This plant was collected long ago by Mr. Charles Moore, as is evident from a single fragment which was cut off from a specimen floated out on brown paper, and is now in the Melbourne Herbarium. Type material (pl. xii) in British Museum of Natural H Melbourne, Sydney, Brisbane, Perth, and Kew." *Lloyd s.n.* (*holo*: BM; *iso*: K, MEL, PERTH).

10: *Utricularia blackmanii* R.W.Jobson. (section *Pleiochasia*). *Telopea* 14: 50–56, Figs 1–4 (2012).

Type: QUEENSLAND. "Australia: Queensland: Cook: 100 Mile Swamp, E of Mt Surprise (18.205 S, 144.574 E), 20 May 2011, *R.W. Jobson* 1253 (holo: NSW; iso: BRI, K, DNA)" (*holo*: NSW; *iso*: BRI, K, DNA).

11: *Utricularia caerulea* L. (section *Nigrescentes*) *Species Plantarum* 1: 18 (1753).

Type: SRI LANKA. "Ceylon [Sri Lanka], *Hermann s.n.*" (*holo*: BM).

12: *Utricularia capilliflora* F.Muell. (section *Pleiochasia*). *Journal and Proceedings of the Royal Society of New South Wales* 24: 176 (1891).

Type: NORTHERN TERRITORY. "On the Adelaide River; Mr. Holtze junior [*Nicholas Holtze* 1176]" (*holo*: MEL; *iso*: K, NSW).

13: *Utricularia cheiranthos* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 3 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, *ca.* 33 km SW of Oenpelli, *P. Taylor* 17145 (holotypus K)." (*holo*: K).

14: *Utricularia chrysantha* R.Br. (section *Enskide*). *Prodromus Florae Novae Hollandiae*: 432 (1810).

Enskide chrysantha (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: QUEENSLAND. "(T.) B. [Type: Queensland, Point Lookout, Banks & Solander *s.n.*]." (*holo*: BM).

Utricularia barbata R.Br. *Prodromus Florae Novae Hollandiae*: 432 (1810).

Enskide barbarta (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: "Banks et Soland. (T.) B." (*holo*: BM).

Utricularia flava R.Br. *Prodromus Florae Novae Hollandiae*: 432 (1810).

Enskide flava (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: "Banks et Soland. (T.) B." (*holo*: BM).

15: *Utricularia circumvoluta* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (I): 9 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, E of McMinns Lagoon, *ca.* 25 km SE of Darwin, *P. Taylor* 17123 (holotypus K)." (*holo*: K).

16: *Utricularia corneliana* R.W.Jobson. (section *Utricularia*). *Austrobaileya* 8 (4): 602, Figs 1- 3 (2012).

Type: QUEENSLAND. "Australia: Queensland. North Kennedy District; S of Mt Garnet, 9 June 2011, *R.W. Jobson* 1281 (holo: NSW; iso: BRI)." (*holo*: NSW; *iso*: BRI).

17: *Utricularia dichotoma* Labill. (section *Pleiochasia*) *Novae Hollandiae Plantarum Specimen* 1 (2–4): 11, t. 8 (1805).

Utricularia billardierei F.Muell. [nom. illeg.] nom. superfl. *Fragmenta Phytographiae Australiae* 6 (45): 161 (1868).

Pleiochasia dichotoma (Labill.) Barnhart. [comb. nov.]. *Memoirs of the New York Botanical Garden* 6: 53 (1916).

Utricularia dichotoma var. *typica* Domin [nom. inval.]. *Bibliotheca Botanica* 22 (89): 1155 (1929).

Type: TASMANIA. "in capite Van-Diemen." (*holo*: FL, *iso*: MEL).

Utricularia oppositiflora R.Br. *Prodromus Florae Novae Hollandiae*: 430 (1810).

Type: "(J.) *v.v.* [Sydney, N.S.W.]" (*holo*: BM, *iso*: K).

Utricularia speciosa R.Br. *Prodromus Florae Novae Hollandiae*: 430 (1810).

Type: "(J.) *v.v.* [between Sydney & Botany Bay, N.S.W., *R. Brown s.n.*]" (*holo*: BM, *iso*: K).

Utricularia moorei F.E.Lloyd. *The Victorian Naturalist* 53: 107, t. XI, fig. 1 (1936).

Type: "Found by Charles Moore, former Director of the Botanic Gardens, Sydney, in "East Australia" about 1855, though the date is not indicated. The label of the type specimen, which is in the National Herbarium, Melbourne, is in von Mueller's writing." (*holo*: MEL, *iso*: BM, K).

Utricularia rotundifolia F.E.Lloyd. [nom. inval.] *The Victorian Naturalist* 53: 166 (1937).

18: *Utricularia dunlopii* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 3 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, Little Nourlangie Rock, *C. R. Dunlop* 4737 (holotypus K; isotypi DNA, NT)." (*holo*: K; *iso*: DNA).

19: *Utricularia dunstaniae* F.E.Lloyd. (section *Pleiochasia*) *The Victorian Naturalist* 53: 106 (1936).

Utricularia dunstani orth. var. F.E.Lloyd. *Kew Bulletin* Addit. ser. 14: 165–167, (1989).

Type: NORTHERN TERRITORY. "Found by *N. Holtze* (No. 1340) along the Howard River, Northern Australia, 1891. Flowers with "yellowish-brown colour." Type in National Herbarium, Melbourne; cotype in the British Museum of Natural History." (*holo*: MEL; *iso*: BM, K. NSW.).

20: *Utricularia fistulosa* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 3 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Prince Regent River Reserve, *A.S. George* 12507 (*holotypus* K; *isotypus* PERTH)." (*holo*: K, *iso*: PERTH).

21: *Utricularia foveolata* Edgew. (section *Oligocista*). *Proceedings of the Linnean Society of London*: 351 (1847).

Type: INDIA. "In Bengaliâ, uliginosis, Januario [no specimen cited, possibly none preserved, *fide* Taylor (1989)].

Neotype: INDIA. "India, N. Bengal, Titalya, *S. Kurz s.n.*" (*neo*: CAL). Selected by P.Taylor (1989).

Utricularia baoulensis A.Chev. *Memoires publies par la Societe Botanique de France 2 (Memoire 8)*: 186 (1910).

Utricularia baouleensis orth. var. F.L.Erickson [Rica Erickson]. *Plants of Prey in Australia*: 82 (1968).

Type: IVORY COAST. "CÔTE D'IVOIRE – Baoulé, marais fangeux entre Langouassou et Mbayakro sur la vase humide; souvent la base de la plante est sub mergée, 1er août, no 22247 (type) [Aug. Chevalier]." (*holo*: P)

22: *Utricularia fulva* F.Muell. (section *Enskide*). *Transactions of the Philosophical Institute of Victoria* 3: 63 (1858).

Type: NORTHERN TERRITORY. "Around stagnant water near Macadam Range." (*holo*: MEL, *iso*: K).

23: *Utricularia geoffrayi* Pellegr. (section *Meionula*) *Bulletin du Musee d'Histoire Naturelle de Paris* 26: 181 (1920).

Type: CAMBODIA. "Cambodia, Kep. *Geoffray* 432." (*lecto*: P [lectotype selected by Peter Taylor (1989)]).

24: *Utricularia georgei* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 3 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Kimberley, Mitchell River, *C.R. Dunlop* 5296 (holotypus K; isotypi CANB, DNA, MEL, PERTH)." (*holo*: K; *iso*: CANB, DNA, MEL, PERTH).

25: *Utricularia gibba* L. (section *Utricularia*) *Species Plantarum* 1: 18 (1753).

Type: UNITED STATES OF AMERICA. "*Habitat in* Virginia, *Clayton s.n.*" (*holo*: BM).

Utricularia exoleta R. Brown. *Prodromus Florae Novae Hollandiae*: 430 (1810);

Utricularia gibba subsp. *exoleta* (R.Br.) P.Taylor. *Mitteilungen der Botanischen Staatssammlung Munchen* 4: 101 (1961).

Vesiculina gibba (L) Raf. *Flora Telluriana* 4: 109 (1838).

Type: NEW SOUTH WALES. "(J.) *v.v.* [Australia, New South Wales, Hawksbury] *R. Brown s.n.*" (*holo*: BM).

Remaining synonymy extensive, see Taylor 572-577 (1989) for full citations.

26: *Utricularia hamiltonii* F.E.Lloyd. (section *Pleiochasia*) *The Victorian Naturalist* 53: 109, t. XI, fig. 1 (1936).

Utricularia hamiltoni orth. var. F.E.Lloyd

Type: NORTHERN TERRITORY. "*Holtze,* 1861, near Adelaide River, flowers "light mauve". Type in National Herbarium, Melbourne. Co-type in British Museum of Natural History." (*holo*: MEL, *iso*: BM).

27: *Utricularia helix* P.Taylor. (section *Pleiochasia*) *Kew Bull.* 41: 4 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Cape Le Grand National Park, *Taylor* 12016" (*holo*: K; *iso*: BM, CANB., GH, L, MEL, NSW, NT, PERTH).

28: *Utricularia holtzei* F. Muell. (section *Pleiochasia*). *The Victorian Naturalist* 9: 176 (1893).

Type: NORTHERN TERRITORY. "Near the Adelaide-River; *M. & N. Holtze* 1164." (*holo*: MEL; *iso*: AD, K).

29: *Utricularia inaequalis* DC. (section *Pleiochasia*) *Prodromus Systematis Naturalis Regni Vegetabilis,* 8: 666 (March 1844).

Type: WESTERN AUSTRALIA. "in Nova Hollandia occid. ad flumen Cygnorum [Swan River] (*Preiss* n. 1918)" (*holo*: G-DC).

Utricularia hookeri Lehm. *Novarum et Minus Cognitarum Stirpium Pugillus* 8: 47 (1844).

Type: WESTERN AUSTRALIA. "Habitat in locis uliginosis Peninsulae (Perth). (Herb. Preiss. no. 1918)" (*holo*: G-DC; *iso*: BR, C, MEL, P, W).

Utricularia linearifolia Benj. *Linnaea* 20: 306 (1847). Partly excluded description and specimen "Ins. van Diemen (Gunn. Lindl.)" (CGE).

Type: WESTERN AUSTRALIA. "flum. Cygnorum (Drummond. n. 508 et 509 partim)."

Utricularia latilabiata Benj. *Linnaea* 20: 315 (1847).

Type: WESTERN AUSTRALIA. "Nova Holland. ad flum. Cygnorum. (Drummond. n. 128)."

30: *Utricularia involvens* Ridl. (section *Oligocista*). *Journal of Botany, British and Foreign* 33: 11 (1895).

Type: MALAYSIA. "Malay Peninsula, Kedah, on Kedah Peak (Gunong Jerai), in streams and wet spots at 3000 ft. altitude, *Ridley s.n.*" (*holo*: SING).

Utricularia pterocalycina O.Schwarz. *Repertorium Specierum Novarum Regni Vegetabilis* 24: 97 (1927).

Type: NORTHERN TERRITORY. "Koolpinyah, sandy flat (*Bleeser* no. 392)." (*holo*: B†).

31: *Utricularia jobsonii* Lowrie. (section *Enskide*). *Carnivorous Plants of Australia Magnum Opus,* Appendix: 1273 (2013).

Type: QUEENSLAND. "Tozers Flat, near Tozers Gap, *ca.* 18 km NW of Lockhart River, 200 m N from Portland Road, Iron Range Resource Reserve, Queensland, 12° 43' 27.65"S 143° 12' 29.97" E, *Allen Lowrie* 3506 & *Paul Simmons*, 20 July 2007." (*holo*: NSW).

32: *Utricularia kamienskii* F.Muell. (section *Pleiochasia*). *The Victorian Naturalist* 9: 175–176 (1893).

Type: NORTHERN TERRITORY. "Near the Adelaide-River; *M. & N. Holtze* 1158." (*holo*: MEL; *iso*: AD, K).

33: *Utricularia kenneallyi* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 4 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Kimberley, [Bent Orchid Falls, a non gazetted name, 14° 48' 30" S, 125° 53' 00" E, *c.* 6.5 km east of Mitchell Plateau airstrip] Mitchell Plateau, *K.F. Kenneally* 8143 (holotypus K isotypus PERTH)." (*holo*: K; *iso*: PERTH).

34: *Utricularia kimberleyensis* C.A.Gardner. (section *Pleiochasia*). *Bulletin (Western Australian Forests Department)* 32: 90 (1923).

Type: WESTERN AUSTRALIA. "Ashton Creek, Headwaters of the Charnley River, near Mount Agnes, in sandy swampy places, among grass. Fl. m. [flowering mid] June, *C.A. Gardner* 1412" (*holo*: PERTH; *iso*: NSW).

35: *Utricularia lasiocaulis* F.Muell. (section *Pleiochasia*). *Australasian Chemist and Druggist* 8 (90): 50 (1885).

Type: NORTHERN TERRITORY. "Near Port Darwin; *Maurice Holtze* 477 (of 1885)." (*holo*: MEL).

36: *Utricularia lateriflora* R.Br. (section *Australes*). *Prodromus Florae Novae Hollandiae*: 431 (1810).

Type: NEW SOUTH WALES. "(J.D.) *v.v.* [Sydney, N.S. W., *Robert Brown s.n.*]" (*lecto*: BM; *isolecto*: K).

Utricularia parviflora R.Br. *Prodromus Florae Novae Hollandiae*: 431 (1810); A.DC. *l.c.* [= at the place cited] (1844), not *U. parviflora* Buch.-Ham. Ex Sm. (1808).

Type: NEW SOUTH WALES. "(J.) *v.v.* [Sydney, N.S. W., *Robert Brown s.n.*]" (*holo*: BM; *iso*: K).

37: *Utricularia leptoplectra* F.Muell. (section *Pleiochasia*) *Australasian Chemist and Druggist* 8 (90): 50 (1885).

Type: NORTHERN TERRITORY. "Near Port Darwin; *Maurice Holtze* 508." (*holo*: MEL).

38: *Utricularia leptorhyncha* O.Schwarz. (section *Pleiochasia*) *Repertorium Specierum Novarum Regni Vegetabilis* 24: 97 (1927).

Type: NORTHERN TERRITORY. "Port Darwin, 4 miles NE (*Bleeser* no. 145" (*holo*: B† [presumed destroyed in WWII).

Lectotype: "Australia, Northern Territory, 4 miles NE. of Port Darwin, *Bleeser* 145 (*holo*: B †)."

Neotype: "near Berry Springs, *ca.* 32 km SSE. Of Darwin, *Adams* 1722" (*neo*: K, *isoneo*: CANB). Selected by Peter Taylor in *Kew Bulletin* Addit. ser. 14: 148–150 (1989).

39: *Utricularia limosa* R.Br. (section *Nelipus*) *Prodromus Florae Novae Hollandiae*: 432 (1810).

Nelipus limosa (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: QUEENSLAND. "*Banks et Soland* [*s.n.*]. (T.) B. [Endeavour River]" (*holo*: BM).

Utricularia ceratophylloides O.Schwarz. *Repertorium Specierum Novarum Regni Vegetabilis* 24: 98 (1927).

Type: NORTHERN TERRITORY. "Port Darwin, 14 miles E, in water (*Bleeser* no. 484)." (*holo*: B†[destroyed in WW II *fide* Peter Taylor 1989])

40: *Utricularia linearis* Wakabayashi. (section *Pleiochasia*) *Journal of Insectivorous Plant Society* (Japan) Vol. 61 (4): 88 (2010).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, Howard Springs, southeast of Darwin, 12° 27' 37.2" S, 131° 03' 53.1" E, Alt. 13 m, *H. Wakabayashi*, 14 May 2010 (*holotypus* NDC-13972)." (*holo*: NDC).

41: *Utricularia menziesii* R.Br. (section *Pleiochasia*) *Prodromus Florae Novae Hollandiae*: 431 (1810).

Type: WESTERN AUSTRALIA. "(M.) [Western Australia, King George Sound] *D. Menzies v.s.* [= *vidi siccam*, I have it in a dried state]" (*holo*: BM).

Utricularia macroceras A.DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 8: 666 (1844).

Utricularia menziesii var. *macroceras* (A.DC.) Lehm. *Plantae Preissianae* 1 (3): 339 (1845).

Type: WESTERN AUSTRALIA. "in Nova Hollandia occid. ad flumen Cygnorum [Western Australia, Swan River] (*Preiss* n. 1917)" (*holo*: G-DC; *iso*: FL, MEL, W).

42: *Utricularia minutissima* Vahl. (section *Meionula*) *Enumeratio Plantarum* 1: 204 (1804).

Type: MALAYSIA. "Habitat circa Malaccam [Malay Peninsula], *König s.n.*" (*holo*: C).

Utricularia pygmaea R.Br. *Prodromus Florae Novae Hollandiae*: 432 (1810);

Vesiculina pygmaea (R.Br.) Raf. *Flora Telluriana* 4: 109 (1838).

Type: QUEENSLAND "*Banks & Solander* [*s.n.*] (T.) [Cape Grafton] B." (*holo*: BM).

43: *Utricularia monanthos* Hook.f (section *Pleiochasia*) *The botany of the Antarctic voyage of H.M. Discovery ships Erebus and Terror*. III. *Flora Tasmaniae* 1 (4): 299 (1844).

Type: TASMANIA. "Wet sandy ground near Arthur's Lakes, *Gunn* 896." (*holo*: K [K000779885]; *iso*: NSW).

44: *Utricularia muelleri* Kamienski. (section *Utricularia*). *Berichte der Deutschen Botanischen Gesellschaft* 12: 5 (1894).

Utricularia inflexa (Forssk) var. *stellaris* (L.f.) P.Taylor. *Kew Bulletin* 18: 191 (1964).

Type: NORTHERN TERRITORY. "Port Darwin, Australia *Holtze* 474" (*lecto*: MEL).

45: *Utricularia nivea* Vahl (section *Nigrescentes*). *Enumeratio Plantarum* 1. 203 (1804).

Type: SRI LANKA. "Ceylon [Sri Lanka], *Koenig s.n.*" (*holo*: C).

46: *Utricularia odorata* Pellegr. (section *Oligocista*). *Bulletin du Museum d'Histoire Naturelle. Paris [Series 1]* 26: 182 (1920).

Type: CAMBODIA. "Cambodge [Cambodia]: Kampot, *Geoffray* 464." (*holo*: P).

Utricularia pterocalycina O.Schwarz. *Repertorium Specierum Novarum Regni Vegetabilis* 24: 97 (1927).

Type: "Australia, Northern Territory, Koolpinyah, sandy flat (*Bleeser* no. 392)." (*holo*: B†).

Utricularia wallichiana Wight. *Icones Plantarum Indiae Orientalis* 4 (4): t. 1572/1 (1850).

Type: (not cited).

47: *Utricularia paulineae* Lowrie. (section *Pleiochasia*) *Nuytsia* 12 (1): 38 (1998).

Type: WESTERN AUSTRALIA. "22.1 km north of Augusta, Western Australia, 34° 08' 11" S, 115° 06' 53" E, 7 December 1996, *A. Lowrie* 1655." (*holo*: PERTH 04680510; *iso*: MEL).

48: *Utricularia petertaylorii* Lowrie. (section *Pleiochasia*). *Nuytsia* 14 (3): 406 (2002).

Type: WESTERN AUSTRALIA. "North East Rd, *ca.* 3 km south of Albany Highway, upper Serpentine River, 32°29'S, 116°18'E, Western Australia, 10 November 1990, *A. Lowrie* 184." (*holo*: PERTH 05849500; *iso*: MEL, K).

49: *Utricularia quinquedentata* F. Muell. ex P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 4 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, near Adelaide River, *M. & N. Holtze* 1177 (*holotypus* MEL; *isotypus* BM)." (*holo*: MEL, *iso*: BM).

Utricularia quinquedentata F.Muell. [nom. Inval.] & *Utricularia albiflora* var. *quinquedentata* F.Muell. [nom. Inval.] *The Victorian Naturalist* 9: 176 (1893).

Type: NORTHERN TERRITORY. "Messrs. *Holtze* on the Adelaide-River." [Neither status accepted by Peter Taylor.]

50: *Utricularia rhododactylos* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 5 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, Mt Gilruth, Deaf Adder Gorge, *C.R. Dunlop* 4414 (holotypus K; isotypus DNA)." (*holo*: K; *iso*: DNA).

51: *Utricularia simmonsii* Lowrie, Cowie & Conran. (section *Minutae*) *Telopea* 12 (1): 33 (2008).

Type: Northern Territory: "1 km north of Girraween Rd - Anglesey Rd corner, 12° 30'S 131° 06'E, *R. K. Harwood 1550*, 3 June 2006" (*holo*: DNA; *iso*: AD, BRI, CANB, K, MEL, MO, NSW, PERTH).

52: *Utricularia simplex* R.Br. (section *Australes*). *Prodromus Florae Novae Hollandiae*: 431 (1810).

Type: WESTERN AUSTRALIA. "(M.) *v.v.* [Western Australia, King George Sound, *Robert Brown s.n.*]" (*holo*: BM).

53: *Utricularia singeriana* F.Muell. (section *Pleiochasia*). *Journal and Proceedings of the Royal Society of New South Wales* 24: 76 (1890).

Type: NORTHERN TERRITORY. (not cited by Mueller). "Port Darwin, *M. Holtze* 1026" (cited by Taylor 1989) (*holo*: MEL; *iso*: K, NSW).

Utricularia pachyceras O.Schwarz. *Repertorium Specierum Novarum Regni Vegetabilis* 24: 98 (1927)

Type: NORTHERN TERRITORY. "Port Darwin, 4 miles NE, wet situation (*Bleeser* no. 212)." (*holo*: B†).

54: *Utricularia stellaris* L.f (section *Utricularia*). *Supplementum Plantarum*: 86 (1782).

Lepiactis stellaris (L.f) Raf. *Flora Telluriana* 4: 109 (1838).

Utricularia inflexa var. *stellaris* (L.f) P.Taylor. *Mitteilungen der Botanischen Staatssammlung Munchen* 4: 96 (1961).

Type: INDIA. "Habitat in Indiae agris oryzaceis, in aquosis profundioris. *König* [*s.n.*]" (*holo*: BM; *iso*: LD).

55: *Utricularia subulata* L. (section *Setiscapella*). *Species Plantarum* 1: 18 (1753).

Type: U.S.A.: "Habitat in Virginia, *Clayton* 31." (*holo*: BM; (GH, K photo).

Synonymy is extensive see Taylor 526-528 (1989).

56: *Utricularia terraereginae* P.Taylor. (section *Pleiochasia*) *Kew Bulletin* 41 (1): 5 (1986).

Type: QUEENSLAND. "Australia, Queensland, 10 km E of Edward River Settlement, *S.T. Garnett s.n.,* 5. iv. 1981 (holotypus K)." (*holo*: K).

57: *Utricularia tridactyla* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 5 (1986).

Type: WESTERN AUSTRALIA. "Western Australia, Revolver Creek, upper slopes of Carr Boyd Range, *Hartley* 14510 (holotypus CANB)." (*holo*: CANB).

58: *Utricularia triflora* P.Taylor. (section *Pleiochasia*). *Kew Bulletin* 41 (1): 5 (1986).

Type: NORTHERN TERRITORY. "Australia, Northern Territory, near McMinns Lagoon, *ca.* 32 km SE of Darwin, *J.Must* 702 (holotypus K; isotypi DNA, NT)." (*holo*: K, *iso*: CANB, DNA, NT).

59: *Utricularia tubulata* F.Muell. (section *Pleiochasia*). *Fragmenta Phytographiae Australiae* 9 (74): 48 (1875).

Type: QUEENSLAND. "In paludibus montium pone sinum Rockingham's Bay [Cashmere]; *Armit.* [222]" (*holo*: MEL; *iso*: BM, BO, K).

60: *Utricularia uliginosa* Vahl. (section *Oligocista*). *Enumeratio Plantarum* 1: 203 (1804).

Type: MALAYSIA. "Habitat humidiusculis Indiae orientalis [*fide* Peter Taylor probably Peninsular Malaysia] *König s.n.*" (*holo*: C; *iso*: LD).

Utricularia cyanea R.Br. Prodromus Florae Novae Hollandiae: 431 (1810).

Type: NEW SOUTH WALES. "(J.) *v.v.* [Grose River, N.S. W., *Robert Brown s.n.*]" (*holo*: BM).

61: *Utricularia uniflora* R.Br. (section *Pleiochasia*) *Prodromus Florae Novae Hollandiae*: 431 (1810).

Type: New South Wales: "(J.D.) *v.v.* [N. S. W., Sydney, *R. Brown s.n.*]" (*lecto*: BM, selected by P. Taylor 1989).

62: *Utricularia violacea* R.Br. (section *Pleiochasia*) *Prodromus Florae Novae Hollandiae*: 431 (1810).

Type: WESTERN AUSTRALIA. "Western Australia, King George Sound [Albany], *R. Brown s.n.*" (*holo*: BM).

Utricularia perminuta F.Muell. *Fragmenta Phytographiae Australiae* 6: 160 (1868).

Type: WESTERN AUSTRALIA. "Western Australia, Mount Melville [Albany], *Mueller s.n.*" (*holo*: MEL; *iso*: BOG, K, US, W).

63: *Utricularia volubilis* R.Br. (section *Pleiochasia*) *Prodromus Florae Novae Hollandiae*: 430 (1810).

Type: WESTERN AUSTRALIA. " (M.) *v.v.* [Western Australia, King George Sound, Albany], *R. Brown s.n.*" (*holo*: BM; *iso*: K).

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Field notes from Andalucía, Spain

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Introduction

In late April 2013 Jürg Steiger, Heiko Rischer, and I performed a field trip to Andalusia (Andalucía), southern Spain in order to see and study some carnivorous plant species *in situ*. The following text is a report of our findings and conclusions.

Situated at the westernmost end of the Mediterranean Sea between 36°N and 39°N and spanning the altitudinal range from sea level to almost 3500 m (highest point in continental Spain), Andalusia is inhabited by a diverse flora composed of Mediterranean (adapted to summer drought, usually in lowlands), high mountain (adapted to snow cover and freezing in the winter, limited to high mountain elevations), oceanic (depending on permanently humid, usually frost-free conditions, predominantly in the westernmost parts of Andalusia that are strongly influenced by westerly winds from the Atlantic ocean), and a few xero-tropical (adapted to prolonged drought) elements.

The southernmost corner around Gibraltar and the southernmost cape of the Iberian Peninsula around Tarifa marks the western end of the Betic System (part of the Alpine belt) that extends from there to the easternmost border of Andalusia, and contains most of the region's highland areas, including the Sierra Nevada near Granada as its highest peak. This series of mountain ranges separates the basin of the Guadalquivir River to the north from the Mediterranean basin to the south. It is essentially this montane area that serves as a migration route for plants that are less well adapted to drought than those of the Mediterranean element, and it consequently hosts the majority of carnivorous plants in Andalusia (Table 2), most of which are derived from temperate Subatlantic/Submediterranean (*Pinguicula nevadensis*, *P. grandiflora*, *P. dertosensis, P. mundi, P. vallisneriifolia*) and/or Atlantic (*Drosophyllum lusitanicum*, *P. lusitanica*) elements.

Climate

The general climate of Andalusia is determined by its position in the Mediterranean climatic zone that is marked by mild, humid winters and warm, dry summers (Table 1).

Table 1. Climate of Andalusia.

Place, alt., Koeppen-Geiger Class	Temperature (°C max. / min. / avg.)	Precipitation (mm max. / min. / ann.)
Tabernas (300 m) BSk (Steppe, mid-lat.)	30 (Jul./Aug.) / 9 (Jan.) / 18	38 (Oct.) / 4 (Jul./Aug.) / 240
Gibraltar (coast) Csa (Medit.)	25 (Aug.) / 13 (Jan.) / 18.5	146 (Dec.) / 1 (Jul.) / 775
Granada (738 m) Csa (Medit.)	25 (Jul.) / 7 (Jan.) / 15	31 (Dec.) / 2 (Jul.) / 360
Cazorla (753 m) Csa (Medit.)	25 (Jul.) / 6 (Jan.) / 14	57 (Mar.) / 6 (Jul.) / 360

(data from Wikipedia, http://en.wikipedia.org/, retrieved on June 30, 2014)

Places Visited

Los Alcornocales

Located at the westernmost end of the Betic System north of Gibraltar and extending from Tarifa at Spain's southern end to Algodonales some 80 km to the north the natural park Los Alcornocales covers 1678 km^2 and is one of the major natural parks in Spain. The hilly country (the highest peak being Pico del Aljibe, 1092 m alt.) is mainly composed of Aquitanian (Miocene) sandstones and conglomerates (sedimentary flysch units forming the Campo de Gibraltar Complex). The climate is Mediterranean with a strong oceanic influence (Tarifa is already at the Atlantic coast) characteristic for the Tingitano-Onubo-Algarvian province. The vegetation is marked by primary cork forest where it is not disturbed by agriculture. Common woody species being cork oaks (*Quercus suber*), Portuguese oaks (*Quercus faginea*), Pyrenean oaks (*Quercus pyrenaica*), olive trees (*Olea europaea*), alders (*Alnus glutinosa*), holly trees (*Ilex aquifolium*), bay laurels (*Laurus nobilis*), rhododendrons (*Rhododendron ponticum*), and tree heaths (*Erica arborea*).

Sierras de Tejeda, Almijara y Alhama

Situated between Malaga at the southern Mediterranean coast of Spain ("Costa del Sol") and Spain's highest continental peak in the Sierra Nevada, the three ranges in the natural park of Sierras de Thejeda, Almijara y Alhama (together 407 km^2) are an assemblage of mountains of moderate elevation (the highest peaks reaching 2067, 1732 and 1715 m alt., respectively). The landscape is dominated by karstic Jurassic limestone covered by Mediterranean sclerophyllous vegetation and its transition to montane vegetation at higher altitudes.

Sierra de Abrucena

This mountain range in the eastern third of the Sierra Nevada (862 km^2 in the core area of which is protected as a national park) is separated from the main massif by the pass Puerto de la Ragua (2038 m alt.), and it reaches its highest elevation (Chullo, 2612 m alt.) close to this incision. Like the main massif it is predominantly composed of mica schist (metamorphic), and the vegetation is similar at least at lower altitudes. The climate is slightly drier than in the western Sierra Nevada, and immediately to the east of the Sierra de Abrucena is the Desierto de Tabernas, one of the driest places in Spain (240 mm precipitation per year) and Europe's only natural desert. At the northern slope the mountains are forested almost to their summits (which is in sharp contrast to the western Sierra Nevada where the summit area is dominated by scant alpine meadows interspersed with almost barren areas.

Sierra de Segura and Sierra de Cazorla

Surrounded and threatened by the sprawling and highly intensified olive agro-industry of the province of Jaen in north-easternmost Andalusia, the natural park Sierras de Cazorla, Segura y las Villas still harbors the richest forests in southern Spain that already provided the wood for the Spanish Armada. Covering 2143 km^2 it is also the largest natural park in Andalusia. The mountainous area belongs to the Prebetic System (external Betics) to the north of the Penibetic system (that comprises the Sierra Nevada and the Sierras de Tejeda, Almijara y Alhama) and is mainly composed of Jurassic limestone and locally of dolomite. The highest peak (Las Banderillas) reaches 1993 m alt. The Guadalquivir and Segura rivers (the major catchment basins in Andalusia) both originate in the Sierra de Segura.

Los Alcornocales

From a carnivorous plant perspective, *Drosophyllum* occupies a unique position, comparable only to the probably more famous Venus' Flytrap or the still quite enigmatic *Cephalotus*. *Drosophyl-*

Table 2. Carnivorous plants of Andalusia.	
Places visited in 2013 (not visited in 2013)	Species encountered (+ literature and/or previous excursions)
Los Alcornocales	*Drosophyllum lusitanicum* *Pinguicula lusitanica*
Sierras de Tejeda, Almijara y Alhama	*P. vallisneriifolia* *P. dertosensis*
(Sierra Nevada) Abrucena	(*P. nevadensis*) (*P. grandiflora*)
Sierra de Segura	*P. mundi* *P. vallisneriifolia*
Sierra de Cazorla	*P. valisneriifolia* *P. dertosensis*

lum lusitanicum is the sole representative of Drosophyllaceae, and it is restricted to the westernmost part of the Iberian Peninsula and a limited area in adjacent Morocco. The affinity of *Drosophyllum* to the Droseraceae is more remote than generally appreciated, and it is obviously most closely related to the tropical West African liana family Dioncophyllaceae (to which the part-time carnivorous *Triphyophyllum peltatum* belongs). Unlike *Drosera* and most other carnivorous plants with adhesive traps, *Drosophyllum* has the glandular tentacles on the lower, abaxial leaf surface, and they are not capable of rapid movement, a feature it shares with *Triphyophyllum*. Unlike *Triphyophyllum*, all leaves of *Drosophyllum* are, however, carnivorous, and the characteristic hooked leaves of the climbing Dioncophyllaceae have never been observed in the European low shrub (or dwarf tree, as it has sometimes been called) that generally occurs outside the forests. The habitat of *Drosophyllum* is a sandy heathland with sparse competing vegetation marked by comparatively high air and soil humidity. The soil surface is, however, usually bone dry and unexpectedly solid, at least during most time of the year. *Drosophyllum* is found at several places throughout the Los Alcornocales Natural Park (Fig. 1).

Pinguicula lusitanica (Fig. 2) is far less exacting than *Drosophyllum* in its habitat requirements, and it is consequently quite widespread in the oceanic part of Europe and northern Africa, from Algeria to Scotland. Systematically, *P. lusitanica* occupies a basal position in the genus, and it is with some probability the oldest European butterwort. It depends on a continuous supply of surface water, so it prefers wetter places than *Drosophyllum* during active growth and is a characteristic species occurring along ephemeral trickles that may dry up completely during summer.

Sierras de Tejeda, Almijara y Alhama

In Spain, the largest group of *Pinguicula* species (*P. longifolia*, *P. dertosensis*, *P. mundi*, *P. vallisneriifolia*) is specialized on permanently wet limestone rocks (e.g., near waterfalls, along creeks and in narrow gorges) devoid of competing vegetation, usually at low altitude in high mountains, frequently associated with the maidenhair fern, *Adiantum capillus-veneris*. All three mountain ranges in the Sierras de Tejeda, Almijara y Alhama Natural Park are inhabited by at least one of these *Pinguicula* species. We chose two localities of comparatively low altitude at which the butterworts have been observed flowering as early as February in order to encounter well-developed plants in flower. The most noteworthy species is *P. vallisneriifolia* that occurs close to a waterfall in the Sierra de Alhama (Fig. 3). This population was the first to extend the known distribution of the species

Figure 1: *Drosophyllum lusitanicum* near Los Barrios, Los Alcornocales Natural Park.

Figure 2: *Pinguicula lusitanica* growing next to a stand of *Drosophyllum lusitanicum* near Gaucín, Los Alcornocales Natural Park.

Figure 3: *Pinguicula vallisneriifolia* in the Sierra de Alhama (left); *P. vallisneriifolia*, Sierra de Segura (right).

Figure 4: *Pinguicula dertosensis* in the Sierra de Almijara (left); *P. dertosensis*, Sierra de Cazorla (right).

that had been considered an endemic of the Sierra de Segura and Sierra de Cazorla before. More recently (Barona *et al.* 2008; Navarro *et al.* 2010), additional populations have been discovered in the province of Valencia, i.e. even beyond Andalusia. This is a remarkable career of a species that has been considered extinct shortly after its discovery, considered extremely rare after its rediscovery, considered extremely local after the discovery of additional populations nearby, and is now known to be fairly widespread and not critically threatened as a more serious floristic investigation has commenced throughout southern Spain.

An interesting parallel is also displayed by the other species in the area, viz. *P. dertosensis*, which is represented in the Sierras de Tejeda and Almijara (Fig. 4) by one population each. This is so far the southernmost known extension of the ranges of both species. But while *P. vallisneriifolia* is apparently restricted to the Betic system, *P. dertosensis* reaches considerably further north to central Spain and Catalunya. The most obvious difference between the two species being leaf length.

Sierra de Abrucena

The Sierra de Abrucena attracted our attention because an outlying population of *P. grandiflora* has been reported from there. This widespread and common species has a western European distribution that is even less oceanic in character (reaching northwestern Italy) than the range of *P. lusitanica* but in southern Europe and northern Africa it is restricted to high altitudes, occurring in

Figure 5: *Pinguicula mundi*, Sierra de Segura (left); *P. mundi*, Rio Mundo (right).

wet places in (sub-)alpine meadows. 2013 saw an unusual outbreak of winter in what should have been spring in the region. The unexpected snowfall even at low altitudes in late April caused several accidents and prevented us from seeing this butterwort at 1700 m alt.

P. nevadensis that grows in the vicinity occurs at even higher altitudes (2000-3000 m) in wet situations with sparse vegetation, and it does usually not appear before June. As far as we know, this is the only endemic carnivorous plant species in Andalusia.

Sierra de Segura and Sierra de Cazorla

All three butterwort species occurring in this natural park are growing in wet limestone habitats comparable to those in the Sierras de Tejeda, Almijara y Alhama Natural Park. Politically, the type locality of the apparently rare *P. mundi* in the vicinity of a locally famous waterfall lies just outside Andalusia in the province of Albacete (Castilla-La Mancha) in the natural park Calares del Mundo y de la Sima (Fig. 5). Due to its unclear taxonomic status and delimitation, the total distribution of this species is not very well known. During our trip we discovered a new site of this species in the core of the Sierra de Segura (Fig. 5), so it is now known to be likewise indigenous in Andalusia.

A rather common sight (if you know where to look) is *P. vallisneriifolia* (Fig. 3) that could be called the heraldic butterwort of the Sierra de Cazorla.

So far the known number of populations of *P. dertosensis* in the Sierra de Cazorla (Fig. 4) is limited but this may well change in the near future.

Morphologically *P. mundi* occupies an intermediate position between *P. vallisneriifolia* (that has still longer, usually hanging leaves) and *P. dertosensis* (that has involute rather than wavy leaf margins) but genetically (based on ITS sequence similarity, Kondo & Shimai 2006) the affinities of *P. vallisneriifolia* lie with *P. balcanica* from the Balkan peninsula, those of *P. dertosensis* with *P. macroceras* (derived in *P.* sect. *Pinguicula*), and those of *P. mundi* with *P. corsica* (the only diploid in the section, nested within a core group that is widespread in Europe and also includes *P. nevadensis* and *P. grandiflora*).

While *P. vallisneriifolia* is tetraploid, *P. dertosensis* and *P. mundi* are both octoploid (Casper & Stimper 2009), and not hexaploid (as reported by Blanca *et al.* 1999). It nevertheless appears somewhat premature to rule out a hybridogenic origin of the latter two taxa.

Further Carnivorous Plant Species from Nearby Areas

In addition to the taxa mentioned above, Andalusia hosts two globally widespread azonal (aquatic) *Utricularia* species, *U. australis* (common in western Andalusia) and *U. gibba* (local in and

around the Donana Natural Park near Huelva), and the circumboreal *Drosera rotundifolia* (local at high altitudes in the Sierra Nevada).

Drosera intermedia that is fairly common in Portugal (frequently growing together with *P. lusitanica*), *P. vulgaris* that is known from the Montes Universales (E Teruel and NW Cuenca Provinces in central Spain) and from the Rif mountains in northern Morocco, and *Utricularia minor* that occurs in highlands of adjacent Castilla-La Mancha, have not been recorded from Andalusia so far.

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Ark of Life reloaded

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Many people will have heard of the Ark of Life project and just wondered why there hasn't been much news lately. Others however will be completely unfamiliar with the project so let me give a short introduction to the project and then get into the actual update that is the reason why I'm writing this.

In 2009, Stewart McPherson developed the idea of an *ex situ* (specimens in cultivation) conservation project for several highly endangered species of *Nepenthes*.

Basically, Stewart found that that the lists of endangered species that were in use didn't reflect the actual situation of species in the wild. Investigating, he found several reasons for this. First, the available data on the wild situation was very limited as not many scientists actually went into the wild to collect information on these plants. The second big reason was that within organizations like CITES (which deals with trade rules for endangered plants) other species, and particularly orchids, had priority. This resulted in strange listings, like having *Nepenthes rajah* listed as CITES Appendix I (the highest level of protection), while it is relatively safe in a nature reserve and guarded by rangers. On the other hand, *Nepenthes rigidifolia*, which, based on its known locations, might very well be effectively extinct in the wild, isn't even mentioned specifically and is relegated to Appendix II classification of "all other *Nepenthes*".

Stewart decided that he wanted to start a project that with a limited amount of money could save the most endangered species by bringing a reasonable amount of genetic variation of those species into cultivation. This goal would be easier to achieve than *in situ* (in the wild) conservation, because saving habitat and providing protection is a slow and costly process that would likely take more time than some species had. He also made some startup capital available through his company, Redfern Natural History Productions.

In 2010, the biennial ICPS conference was held in The Netherlands and on this occasion the first Ark of Life collection was created. Redfern and the ICPS partnered to provide the initial funding and the Hortus botanicus, the botanical garden of the University of Leiden, The Netherlands agreed to house this collection and take care of it. The Ark project started as a small operation with just four target species, *Nepenthes clipeata*, *N. rigidifolia*, *N. khasiana*, and *N. aristolochioides*. Plants were donated by some large nurseries, a website and a Facebook page were created, and a not-for-profit company was set up in the UK.

Initially this went rather well and individual plants and money were donated by private individuals and local carnivorous plant societies, but in 2012 things got a bit quiet.

I would like to explain briefly what happened. Basically, Ark of Life was a one-man operation by Stewart who had no real backup and who had a lot of work on his plate. This included the production of several great books and also the shooting of a 4-part documentary series about the nature of the British overseas territories that will likely hit the screens in 2015 (watch for it, it is really worth watching). The only practical support he had was given by yours truly in the form of some paper shuffling, however, as Stewart still actually controlled everything, progress was made by periods of long waits till he was again back in civilization and short sprints until he left again.

On top of that, the website went down partly because of regular hacking and partly because the company that had built it went bankrupt. A little later, the e-mail account also stopped working.

Lots of fun, I can assure you.

That doesn't mean that nothing was happening. The plants in The Ark received proper care, money and plants were donated, and a search for members of an actual board for The Ark started. Preparations were also made to expand The Ark with other species and policy discussions were held.

So, what is the "State of The Ark" at this moment?

The Ark has a living collection of plants housed in Leiden that consists of several clones of *N. clipeata*, *N. aristolochoioides*, *N. khasiana*, *N. rigidifolia*, *N. vogelii*, and *N. bokorensis*.

Additional hosts where found for a South African Ark and a *Sarracenia* Ark in well-known UK growers Nigel Hewitt-Cooper and Mike King.

A board for The Ark was founded with the following volunteers:

Tim Bailey: Manager, *Sarracenia* Ark
Marcel van den Broek: Administrator
Christian Dietz: Manager, South African Ark
James Ellis: Deputy Manager, *Sarracenia* Ark
Stewart McPherson: Promotions and Fundraising
Francois Mey: Manager, *Nepenthes* Ark
Alastair Robinson: Advisor
Mark Rouse: Deputy Manager, *Nepenthes* Ark
Andy Smith: Advisor
John van der Werf: Treasurer

As I'm writing this we are building the new and much improved website. This will be done in several phases as available time is limited, but the results will be worth it.

Species for the South African Ark have been selected and appropriate basic texts have been written. These species are:

- *Drosera capensis*
- *Drosera cistiflora*
- *Drosera cuneifolia*
- *Drosera coccipetala*
- *Drosera ericgreenii*
- *Drosera esterhuyseniae*
- *Drosera glabripes*
- *Drosera hilaris*
- *Drosera pauciflora*
- *Drosera ramentacea.* This is the true species, not the improperly used name for the commonly occurring *Drosera madagascariensis* that the pharmaceutical industry uses.
- *Drosera regia*
- *Drosera slackii*
- *Drosera zeyheri*
- *Roridula dentata*
- *Roridula gorgonias*

More species may be added as their conservation status becomes clearer.

To the growers of carnivorous plants, *Drosera capensis* might look like a strange addition as it is a commonly grown species and even a weed in most collections. Fact is however that most plants in cultivation can be traced back to a limited number of plants, propagated by tissue culture. The situation in the wild is different and on top of that the species appear to be quite variable and might at one point have to be divided into (sub)species.

Species for the *Sarracenia* Ark are also selected, specifically:

- *Sarracenia oreophila* var. *oreophila*
- *Sarracenia oreophila* var. *ornata*

- *Sarracenia purpurea* subsp. *venosa* var. *montana*
- *Sarracenia rubra* subsp. *alabamensis*
- *Sarracenia rubra* subsp. *jonesii*

Texts for this Ark are in the draft stage.

A thorough policy paper is just about finished and deals with everything from goals, priorities, and several legal aspects.

On the last (the legal) front, a major development is in progress. The Ark is changing status from an UK based not-for-profit company to a foundation with full Charity status under Dutch Law.

These are all huge jobs and they took time, especially in setting them up.

I hope I have given you a good explanation why The Ark has been a bit silent. If all goes as planned, you will start hearing a lot about us during the upcoming year and many years after that.

THE

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New cultivars

Keywords: cultivar, *Sarracenia* 'Amphibien', *Sarracenia* 'Cooke's Bayou Red', *Sarracenia* 'Dantadelle', *Sarracenia* 'Elvis Presley', *Sarracenia* 'Metallized', *Sarracenia* 'Rubis Rare'.

Sarracenia 'Metallized'

Submitted: 16 April 2015

Sarracenia 'Metallized' germinated in spring 2010 as a seedling in the middle of the mature red *S. flava* group I have in my greenhouse. The parentage of the plant is unknown. Maybe a seed fell during the seed collection in the autumn or maybe the result of a casual pollination event.

In spring 2014, the tallest pitcher was 76 cm tall (Fig. 1). At that time, the plant was still immature, since it had not yet flowered.

The pitcher color from early spring to late summer, if kept in full sunlight, is a flat and uniform red to dark red from the pitcher top to the rhizome (Figs. 1 & 2). There are no veins or color shades, with the exception of the lid where some pale veins are visible if seen against the light. The edge of the pitcher opening is irregular and angular. In autumn, some smaller pale red/pink pitchers are produced.

Figure 1: In spring 2014, the tallest pitcher of *Sarracenia* 'Metallized' was 76 cm.

In spring 2015, the plant produced an 85-cm-tall flower stem with a pale red flower seen from above and yellow inside seen from below (Fig. 3). The pitchers seem to grow shorter if the plant is allowed to flower. It is possible that a mature plant could be taller than 76 cm if the flower is removed.

The name 'Metallized' has been chosen because the presence of vegetal waxes inside the pitcher and the absence of pubescence give to the leaves a particular metallic iridescent appearance if observed in full sun. The nuances that are seen by moving the leaves in the sun are difficult to reproduce photographically, as with the iridescence of sundews.

To preserve the unique features of this cultivar, propagation must be vegetative only.

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Figure 2: The pitchers of *Sarracenia* 'Metallized' are dark red with an irregular and angular opening.

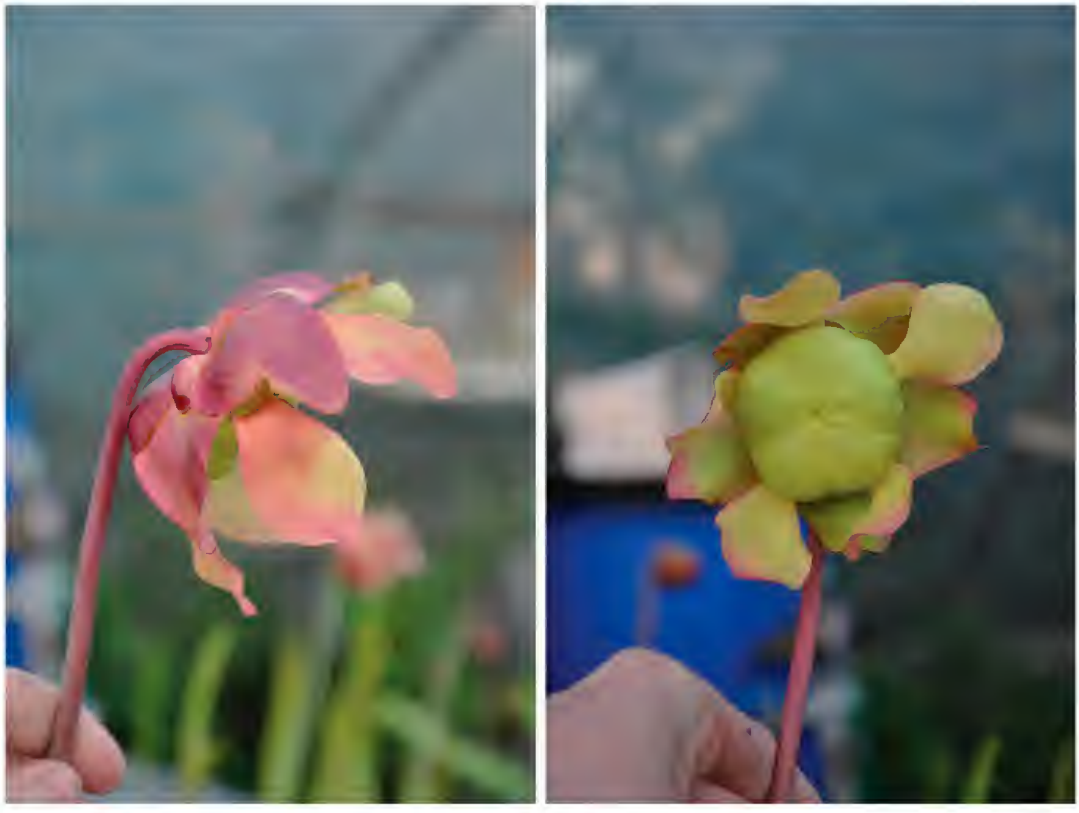

Figure 3: The flower of *Sarracenia* 'Metallized' is pale red when seen from above and yellow inside from below.

Submitted: 10 June 2015

John Hummer obtained specimens of this unique cultivar in 1988. The Bay County, Florida site of origin is no longer extant, having been converted to a housing development about 20 years ago. The plant has entirely maroon-red pitchers top-to-bottom, and is also unique in having flower petals that are pink-red in color (Fig. 4). The distinct maroon red color spectrum of the leaves along with the unique flower petal color combination should be sufficient to distinguish this once naturally occurring *S. flava* variant from others in the field. The images explain this form better than words can describe.

—John Hummer • Ruther Glen • Virginia • USA • john4nature@gmail.com

Figure 4: *Sarracenia* 'Cooke's Bayou Red' maroon-red pitchers (top) and its pinkish-red flowers (bottom).

Sarracenia 'Elvis Presley'

Submitted: 28 April 2015

I obtained this hybrid from a French carnivorous plant specialist called "Damien Chertier" who used to sell carnivorous plants. He didn't remember the origin of this crossing nor the parents.

Sarracenia 'Elvis Presley' is a green yellowish plant wearing delicate red veins on glabrous pitchers at the beginning of the growth season, which become finely pubescent at the end of it (Fig. 5). The pale yellow flower that blooms in spring is a little bit taller than the pitchers and is difficult to pollinate. Indeed, I have almost never obtained seeds from this hybrid, or only a few sterile ones. Just before winter, the plant produces some curved phyllodes toward the ground which could suggest *Sarracenia oreophila* heritage. It grows fast and multiplies easily.

The specific name "Elvis Presley" comes from the particular shape of the lid with its wound spur, which reminds me of the hairstyle of the famous rock 'n' roll singer Elvis Presley.

This hybrid may be the result of complex crossing between *Sarracenia oreophila*, *S. flava*, and *S. alata*. This plant should be reproduced only by vegetative means to ensure that its unique characteristics are maintained.

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https://phagophytos.wordpress.com

Figure 5: Fresh new veined pitchers of *Sarracenia* 'Elvis Presley' (left) and the peculiar shape of the pitcher lid at the end of the growth season is reminiscent of the hair style of Elvis Presley (right).

Sarracenia 'Amphibien'

Submitted: 28 April 2015

I bought this cute hybrid in 2006 from a French carnivorous plant specialist called "Damien Chertier" who used to sell plants. The parents are unknown.

Figure 6: Fresh new pitcher of *Sarracenia* 'Amphibien' (left) and an older pitcher showing pure red coloration (right).

This little *Sarracenia*, which rarely exceeds 35 cm in height, possesses red-veined yellowish pitchers at opening, which become all red very fast (Figs. 6 & 7), arranged in a rosette around the rhizome. The small flower with red-to-purple petals and sepals is borne on a peduncle 45 cm high (Fig. 7). The plant produces a lot of pitchers during the growth season but seems to divide very little, usually once a year during spring.

Sarracenia 'Amphibien' may be the result of a very complex crossing between *Sarracenia psittacina*, *S. purpurea*, and *S. alata*, but it is still unclear as the shape of the pitchers is very different from other hybrids.

Figure 7: Two pitchers of *Sarracenia* 'Amphibien' in the middle of the growth season (left) and its flowers (right).

The name "Amphibien" (amphibian in English) comes from the particular shape of the opening pitcher that reminds me a croaking frog. This plant should be reproduced only by vegetative means to ensure that its unique characteristics are maintained.

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Sarracenia 'Rubis Rare'

Submitted: 28 April 2015

I found this plant in Marcel Lecoulfe's greenhouse in 2005 without a label. The seller told me it was a special variety of *Sarracenia rubra*, which is impossible given the shape and color of the pitchers and the flowers.

The plant is 60 cm tall bearing initially orange pitchers which quickly turn red, copper, and purple (Figs. 8 & 9). The underside of the lid is pubescent. The flower is large, with bright yellow bracts and sepals (Fig. 9) that tend to become copper as the season progresses. The first spring pitchers are usually aborted, very small and broadly winged, but they become better shaped during the summer. This plant doesn't produce a lot of well-formed pitchers.

I called this plant "Rubis Rare" (rare ruby) because of the completely red to purple color of the few pitchers at the end of the growth season.

This hybrid is probably complex, but has certain characteristics of *S. purpurea*. Nevertheless, its yellow flower and red pitchers indicate a probable crossing with *S. flava* var. *rubricorpora* or var. *atropurpurea* or with *S. alata* var. *nigropurpurea*.

Figure 8: One of the first pitchers of *Sarracenia* 'Rubis Rare' at the beginning of the growth season (left) and in the middle of the growth season (right).

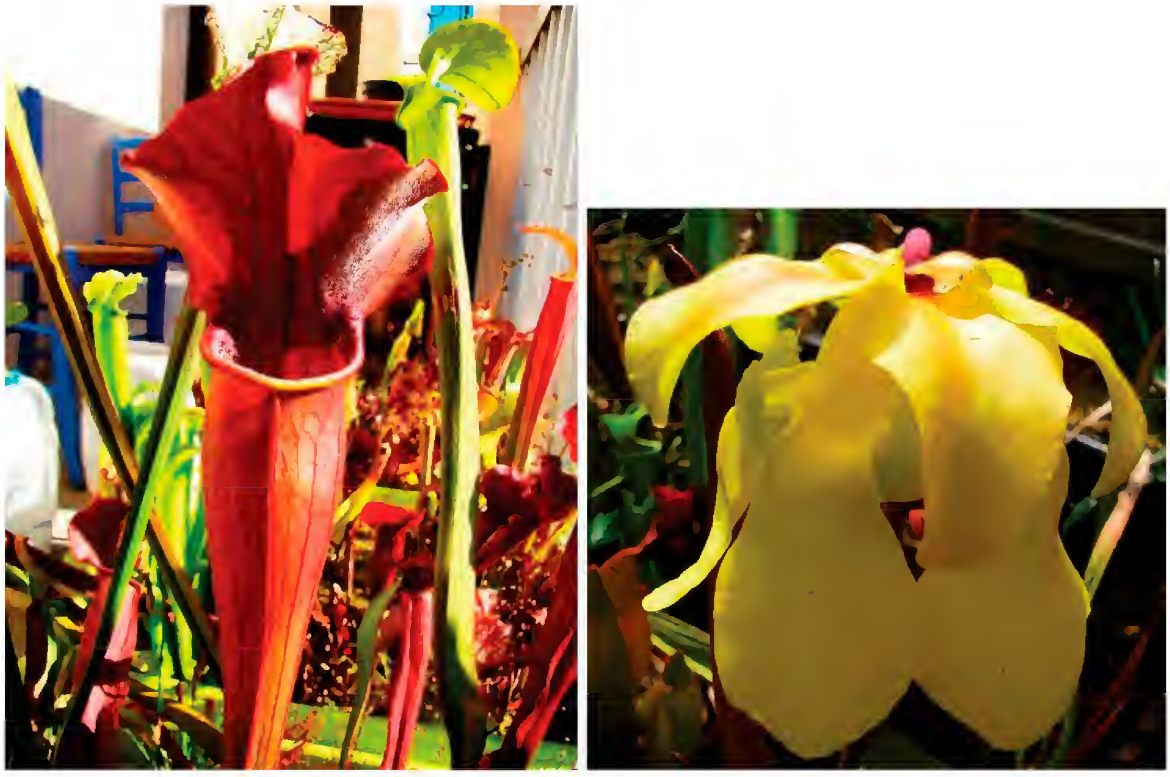

Figure 9: Pitcher of *Sarracenia* 'Rubis Rare' at the end of the growth season (left) and its bright yellow flower (right).

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Sarracenia 'Dantadelle'

Submitted: 28 April 2015

I made this hybrid between *Sarracenia* 'Rubis Rare' × *mitchelliana* in 2008, but I didn't take care of the seedlings until 2013. Indeed, one was larger than all the others, which increased my interest in this crossing. I transplanted it to a large pot and, the year after, it was showing all its characteristics.

The size of the pitchers and the lids are amazingly huge and the plant produces a lot of traps that sometimes fall down under their own weight. At first, pitchers are heavily veined and well colored, but after some weeks they become entirely red (Figs. 10 & 11). The pure yellow flower appears during spring (Fig. 11) and might be shorter than the pitchers. *Sarracenia* 'Dantadelle' produces a lot of sweet nectar and grows fast from very early spring until very late summer.

I have selected this particular plant because it was clearly bigger and different from the other seedlings of the same breeding. I gave it the name "Dantadelle" because of an old bet with friends during my bachelor's degree; I promised them that I will give my first interesting hybrid this name. This cultivar should be reproduced only by vegetative means to ensure that its unique characteristics are maintained.

—Arthur Sanguet • 73000 Chambéry • France • arthur.sanguet@gmail.com
https://phagophytos.wordpress.com

Figure 10: Fresh new pitcher of *Sarracenia* 'Dantadelle' showing green brownish coloration (left) and the particular shape and impressive size of the lid (right).

Figure 11: Three pitchers of *Sarracenia* 'Dantadelle' showing the huge size of the plant, the red coloration of older pitchers (left and middle), and the heavily veined new pitcher (right); and its yellow flower.

Literature Review

By Fernando Rivadavia

Lowrie, A. 2013. Carnivorous Plants of Australia Magnum Opus - Volumes One, Two, Three. Redfern Natural History Productions Ltd., Poole. 1371 pages; 2573 images.

Allen Lowrie's long awaited 3-volume Magnum Opus (=MO) is an awesome update to his previous 3 volumes on CPs of Australia. However it is not just a new edition of the old information! There are new combinations, new records, new taxonomic states, synonyms re-elevated to species level, new sections, and the description of several new species: 1 *Byblis*, 16 *Drosera*, 1 *Utricularia*, as well as new sundew hybrids.

For me, one of the biggest achievements of MO was the more comprehensive resolution of the *D. indica* complex – which I'd been eagerly awaiting for years. It is now split into 11 beautiful species, 10 of which occur in Australia (type *D. indica* does not, interestingly enough). Now to learn how to distinguish between them all….

Which brings me to what may be my biggest peeve with MO: that the species are found in alphabetical order, instead of grouped by taxonomic affinity (subgenera, sections, etc.). I found myself having to constantly flip back and forth between the 3 volumes in order to compare species in the *D. indica* complex, for example.

And yes, MO may be best described as massive. In fact that may be my second biggest peeve: it's too heavy to hold for very long and needs to be read on a flat surface, instead of resting against your belly while lying in bed before sleep (which is how I do most of my reading for pleasure). It might've been more practical and logical to have split the 3 volumes into 5 or more smaller volumes (for example: one volume just for pygmies, one just for tuberous sundews, etc.).

Considering what a huge piece of work MO is, there were surprisingly few typos that I could find, and even fewer instances of weirdly phrased sentences – which tells us a lot about how careful the editing was. As for overall organization, the 3 volumes are split into several sections, starting with an introduction to the types of CPs and their habitats in Australia, followed by an overview of the different groups of sundews and sundew bugs. Then comes an interesting section with keys to ID all the species, including traditional botanical keys, beautiful pictorial flower keys, and well as a pygmy sundew gemmae key.

After a brief description of the different plant parts used in taxonomy (and a beautiful but too-brief section with SEM images of their seeds, showing only a handful of species), finally the species descriptions begin, almost 200 pages into the first volume. In the usual style of Allen's previous books, each species is treated in 4 pages.

The first page contains a full botanical description, distribution, habitat, flowering period, etymology, affinities, and (my favorite part) notes about when and how each plant was discovered by the author, natural variation, or other curiosities. For species that also occur outside of Australia the distribution is sometimes listed, but other times not, which I found a bit odd.

The second page displays Allen's beautiful line drawings, highlighting important characters for each species. To my vexation, the majority of species were missing drawings of their seed! This was even true for the new species described, and for some species where seed were said to be exceptional in some way (e.g. *D. fulva* and *D. verrucata*, which is even named after its unusual seeds).

The third page shows a nice satellite map, etched with the species' distribution in (but unfortunately not outside) Australia, as well as a key to the beautiful pictures on the fourth page. Although

the majority of pictures on the fourth page are truly gorgeous, I wish there were less close-ups of flowers and more habitat shots or pictures showing the entire plant habit. For example in the *D. petiolaris* group, only *D. caduca* and *D. paradoxa* are shown as entire flowering plants. All the rest are pictured as rosette or flower close-ups only. Flower shots dominate for many of the sundew species (e.g. *D. cucullata*) and in some cases are pretty much all that is shown (e.g. *D. drummondii*). For some species there only seem to be shots in cultivation, unfortunately (e.g. *D. microphylla* and *D. menziesii*).

While reading each species description, I often found myself flipping to page 4 to see pictures of things described on page 1… only to find that they were not properly pictured or not shown at all. Unfortunately this happened a little too often, regarding certain features or oddities like the grey ovaries of *D. hyperostygma*, the club-shaped organ of *D. fragrans*, involute leaf vernation of *D. praefolia*, flower color forms of *D. spilos*, horned stamens of *D. fulva*, white form of *U. violacea*, the column-like form of *D. myriantha*, and especially descriptions of mass flowerings or large colonies of certain species.

Finally, after all the *Utricularia* in volume 3, comes a section with a biography for every single author of an Australian CP, whether one or a dozen species were named by that author. Although my initial thoughts were that 81 pages on biographies was a waste of paper in a CP book, I'll admit that I found myself spending much more time than I expected reading the interesting stories behind all those botanists, explorers, and CPers.

Closing the 3 volumes is a taxonomic appendix containing new species descriptions, new sections, new combinations, etc., as well as a nice segment with more information on the *D. indica* complex (including some cool SEM shots of seeds and unfortunately the single picture of type *D. indica* in the whole of MO), 25 pages listing all the species treated in MO (not sure why this was included), a glossary, bibliography, index, as well as a few other bits and pieces for taxonomists (or explaining taxonomy for the lay).

This latter section also included what for me was probably the most "fun" part of the whole MO: 10 pages that teach you how to pronounce all of the species names. Even without the help of any stimulants, I had a long laugh attack trying to vocalize all of the Latin names with an Australian twang.

Cultivators often complain about the constant change in plant names, and there is plenty of it in MO. But this is inevitable since taxonomy is always in flux as new species are discovered, old species re-evaluated, and old synonyms have to be brought back from the grave. Many people don't realize that botanists spend a lot of time studying dried herbarium specimens, sometimes centuries old, many times highly fragmented, and often missing important parts.

Numerous pictures of old (and very important) herbarium specimens are presented in MO. On page 63 of volume I, Allen shows one particularly important specimen, the type of *D. petiolaris* from Queensland. This was collected in 1770, on Captain Cook's first expedition to Australia, and if I'm not mistaken it was the first sundew ever collected on that continent by Europeans. Although Allen wrote that he obtained this historical collection on loan from the British Museum in 1994, I can say that it was actually in 1993, since I happened to be visiting Allen in July of that year and clearly remember seeing it. Unbeknownst to Allen, it had a huge impact on me, bigger than any live plant I saw in Western Australia on that trip. I was 21 and had only began studying CPs in the wilds of Brazil 3 years before. Botany and taxonomy were still very new concepts in my mind. I remember being awed at the excellent quality of that *D. petiolaris* herbarium sheet, at how intact the plants were, as if they'd been pressed very recently – even though the collection was over 200 years old. The reason why I remember this so clearly is because that was the moment that the historical importance of herbarium specimens finally dawned on me. Until then, I'd been hesitant to press plants in the field,

not wanting to kill beautiful sundews. But the *D. petiolaris* type specimen made me realize what an important and long-lasting snapshot of nature herbarium specimens represent. Reading page 63 of MO sent new chills down my spine.

In conclusion, I must address the most common criticism I hear regarding Allen's numerous publications, including MO: that he is a splitter. Yes, of course there are numerous cases where taxonomic rank can be (and has been) hotly debated when it comes to Allen's species. In MO there are many such examples where species rank is tenuous at best (*D. depauperata* vs. *D. pulchella*, *D. pygmaea* vs. *D. micra*, *D. macrophylla* vs. *D. monantha*, and several others), and yet *D. binata* was not split into the multiple taxa that it maybe deserves to be, and *D. spatulata* var. *gympiensis* was not recognized, when it could easily have been given species status.

There is no doubt that Allen is truly a splitter, but is that really a bad thing? I think it is the duty of all field researchers to study and publish all known natural variation, in the hopes that biodiversity can be preserved wherever it exists. Splitters are thus important in that they raise red flags for the environmentalists and other taxonomists, who can then probe deeper with further studies. Follow-up research will almost inevitably change taxonomic ranks one way or another, sometimes flipping multiple times over decades and centuries. However I don't fret too much about what the exact taxonomic rank of a taxon "should" be, knowing that species concepts are not only varied but also always in flux. Taxonomic changes should not be viewed as something bad and wasteful, but as a productive and increasing accumulation of scientific knowledge.

And that is how I view Allen's MO: as a treasure trove of knowledge about the fantastic CP biodiversity on the Australian continent that every CP lover should own. A definitive work? Quite the contrary, it is already outdated! Several new and unpublished taxa are mentioned in MO and a few new *Utricularia* recently published by Richard Jobson did not make the cut. Therefore, I am ecstatic to have these 3 massive volumes in hands to pour over all those beautiful species for now, but I look forward to buying revised editions of MO every 5–10 years for as long as Allen lives.

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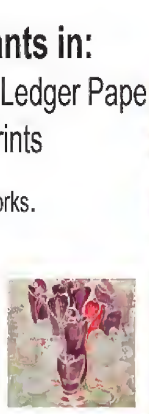

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Drosera verrucata

Drosera dichrosepala